The Builder.

VOL. XVIII.—No. 886.

Saltaire.

CUTTING aside the gigantic size of the establishment at Saltaire, it exhibits so many other points of interest, that all who go to Bradford, or any other neighbouring town in thriving, far-seeing, hard-fighting Yorkshire, should visit it. The expenditure which was ventured on, to economise labour, to expedite processes, to obtain completeness, and to ensure the comfort of the 3,000 persons who are engaged in the works, will surprise many; but the wisdom of it, even in a financial point of view, soon makes itself evident. Our readers do not require to be told that the title which the mills and rising town bear gives us the name of its enterprising founder, Mr. Titus Salt, M.P., and that of the locality, the beautiful valley of the Aire, in which it is built. It is a joke against the Prince Napoleon, that in an account he gave of the Paris Exhibition of 1855, he pointed out that Mr. Titus had exhibited some magnificent examples of salt! The place of which we are speaking is indeed a magnificent exhibition of Salt, and it is to be hoped that he may long live to enjoy the honour it has deservedly gained him. In a previous volume* we gave a view and plan of the mill, and showed how, with an extension of the Leeds and Bradford Railway in front of it, and the Leeds and Liverpool Canal behind it, the greatest facilities exist for bringing up the raw materials and coal, and sending away the manufactured goods, while plenty of water is obtainable for the steam-engines and the processes. Take a few statistics, all in a heap, and get an idea at once of the magnitude of the undertaking. The buildings for the works cover 6½ acres. The main range of buildings—a fine substantial piece of work, fire-proof, and highly creditable to Messrs. Lockwood & Mawson, the architects—extends 550 feet in length and 72 feet in height; and as the top story runs over the central entrance archway, and reaches the whole length of the mill, we get a room 550 feet in length—the longest perhaps in Europe; and, looking from one end to the other, a fine sight it is. The Weaving Shed, however, attached to the mill, eclipses that in area; for here we have in one apartment 2 acres,—room to dine comfortably 7,000 persons. In the Combing Shed, of half its area, Mr. Salt did dine 3,500 persons, when the building was first brought into use. Men, women, and children, are at work throughout the building; steam-engines of 1,250 horse-power collectively give motion by 2 miles of shafting to 1,200 power looms; and when we add that the daily produce of these is 30,000 yards, or 5,000 miles annually; in other words, that the length made in a year and a half is more than enough to reach from one side of our globe to the other, if there were a hole through the middle; the skill, energy, and capital, required to carry on such an undertaking, will be strikingly evident.

Professional visitors would examine with interest the mode of construction adopted in the mill proper, to render it fire-proof,—*hollow* brick arches and *wrought* iron girders for the floors; and would, probably, grieve with us that the same precaution was not adopted throughout. They would observe, too, the mode in which fresh air is admitted to each story, and the foul air allowed to escape; and the satisfactory construction of the great chimney. Those interested in machinery would notice the prompt adoption of new inventions: the beautiful combing machine, which is said to have cost Mr. Salt 32,000*l.*; the arrangement for washing the wool, and for drying it,—in one place by centrifugal action, and in another by warm air. In the sorting-room it would occur to them that some arrangement should be made to free the air, or otherwise to preserve the workmen from the dust of the wool; but, generally speaking, they would find little occasion for comment. The care with which all advantages are husbanded is shown in various ways; in this, for example: that the water resulting from the processes, and containing fatty matter, which was formerly allowed to run to waste in the canal, is now collected and strained, and produces 2,000*l.* a-year. The smoke is, for the most part, consumed; the heat from the boilers utilized to the greatest extent.

Leaving the mill, there will be found 450 houses for the people engaged; a large dining-hall for special occasions, at present used as a school-house; and a costly church, with a steeple and semicircular portico of the Corinthian order, at the west end,—the interior being fitted up with handsome plaster-work and scagliola columns, the latter well executed by Dolan, of Manchester.

Returning to the dwellings for an instant, it may be mentioned that for a cottage with three rooms upstairs and two below, the sum of 3s. 8d. a week is paid, including the rates and water-supply. With the arrangement of the houses no fault can be found excepting this, that the cesspool system is in use, pending the determination of how best to act otherwise. This should be allowed to continue no longer; and then, if careful records were kept, we might expect to find the death-rate in Saltaire a low one. It is a noble monument of private enterprise, liberality, and wisdom.

* Vol. xii. p. 438.

AN ERMINED ARCHITECT.

WE are not about to confute King Solomon's proposition, that there is nothing new under the sun, by an announcement that a member of the architectural profession is about to be raised to the peerage: we simply purpose to pursue a train of thought suggested by a remark made at a recent meeting of the Royal Institute of Architects. One of the members observed, in reference to another, that had he attained the same eminence in the profession of arms, or law, that he had gained in his own, he would have been created a peer long ago. The first question that rises to the surface out of the host engendered by this observation is—Why so? How far do the services of a soldier, or a lawyer, exceed those of an architect in a national point of view?

We contend that architecture conduces as much to the enduring fame of a nation as military glory; and, in its care for the well-being of the people in their homes, tends as much to the maintenance of public order, as legal instruments do. We are able to realize the grandeur of the Greeks and Romans, as much by the remains of their architecture—their columns of agate, alabaster, and jasper,—as by the relation of warlike deeds and civic virtues in those portions of their literature that are preserved to us; and in the case of the Assyrians and Egyptians infinitely more so. Their soldiers have perished in numbers nearly as countless as the sands of the scorched desert: the papyrus rolls of the lawgivers have been consumed by time; but the works of their architects endure, and the sun still casts the same shadows from the imperishable fabrics on the banks of the Nile that it did 4,000 years ago. We ask how is the greatness of a people visible to foreigners, if not in the extent of their cities and grandeur of their buildings; and how can it be made evident to future generations by any other means? The Danes conquered the country as well as the Romans; but we have formed very different estimates of the two races. Simply because the one has bequeathed us but a few legends relating to their conquests, and a few names; while the other has left us traces of fifty walled towns, with temples, baths, and other public buildings in each. By the same rule posterity would think but little of us if we handed down a mere territory unenriched with buildings. When the Crusaders arrived at Constantinople, on their road across Europe to the Holy Land, they were overpowered, say the old writers, with the magnificence of the city. The gilded minarets of the mosques, blazoning against the opal sky, appeared to them to represent a land of enchantment. A tented plain could not have produced such an effect.

We are next tempted to inquire how far the popular notion of an architect's acquirements represents the varied learned and accomplished skill he should possess. We suspect that few superficial observers take into consideration the fact that in the matter of mathematics, acoustics, the laws of health, and intimate acquaintance with all the branches of the fine arts, architecture is more exacting than either of the professions now contrasted with it. If a knowledge of the dead languages be required for a study of the law, is it not equally so for the study of architecture? Are not all the old muniments written in Latin, and all inscribed stones up to a certain date in the same tongue? Think of the pale tinted chronicles of the old religious houses, perfumed with the scent of departed centuries, and of all the mediæval memorials, whether on stone, on glass, on wood, or on vellum: are they not all written in Latin? Without going so far as Vitruvius, in his well-known treatise, who insisted that the education of an architect should comprise a mastery of the whole circle of sciences, we repeat that his learning must be very comprehensive.

The importance of the use of these varied attainments in the practice of an architect cannot be too highly estimated. The extent of the population is influenced by them; for, if efficient architects were in all cases employed to superintend the erection of dwelling-houses, more especially those of the poor—too often run up by builders in careless defiance of decency and health, a marked difference would be seen in the number of deaths resulting from preventible causes. We do not hesitate to say that our sovereign lady the Queen would be in possession of many a regiment of fine-grown men, whose premature loss, as proved by the returns of the Registrar-General, is consequent upon undrained houses and unventilated apartments. Surely it is as useful to rear soldiers as to command them.

The chance of sudden loss of life in the pursuit of a profession can scarcely be considered to ennoble it; but, if it be so estimated, the architect, being scarcely less exposed to it than the soldier, must be proportionably entitled to distinction. Any visitor to a large building, in course of erection, must be struck at the danger to life from carelessness, on every side. A false step on a scaffolding stage, the fall of an unbalanced stone, momentary dizziness or forgetfulness on a ladder, are accidents of too frequent and fatal occurrence. Probably Ely Cathedral is never visited for the first time unassociated with the remembrance of the architect who lost his life there. William de Sens left Canterbury Cathedral with a broken leg. And there are other instances too numerous to mention. We remember that the old Greenwich pensioner who used to show the chapel of the hospital always recounted, with something like martial pride, the narrow escape of the painter's life in the execution of the allegorical decorations of the ceiling.

It seems to us that the lives of her Majesty's subjects are as much in the keeping of architects as they are in that of their other "brave defenders," the army and navy. A church, built without a knowledge of the laws of resistance and pressure, falling upon a large congregation, would do as much havock, to as many people, as a grand pitched battle. Or insecure foundations for a parliament house might be as fatal in their consequences as an undetected gunpowder plot. And, by way of inverting our examples, proper attention to the philosophy of architecture, as shown in its sanitary arrangements, would be as beneficial to a nation as a long season of peace.

The Lord Chancellor on his woolsack has always been considered, and is, a fine sight; and so is a regiment of horse-guards, their tasselled plumes fluttering in the breeze, and their cuirasses glittering in the sunshine as their steeds curvet; but they must both give precedence to architecture in point of beauty. Take any one of our cathedrals, with their clustered columns and vaulted roofs, their "tracerie of lace," their exquisite proportions and superb details, and point out, if you can,

a more lovely object. Then own that a mind attuned to such soul-filling harmony, and capable of conceiving similar creations, cannot be unworthy of a place among England's gifted sons. We would not be understood to affirm that architecture has been without any recognition: on the contrary, the barren dignity of knighthood has been frequently awarded within the last two centuries; and, in the old times before us, as in the instance of William of Wykeham, honours were heaped upon its promoters, if not professors; but in modern times they have not been so distinguished. Considering how inseparably history is associated with architecture, to what an extent contemporary and posthumous fame depend upon it, and in what measure the population is influenced by the observance of its laws, it can scarcely be denied that the dignity of the profession is not unentitled to ermine.

RUSKIN ON PERSPECTIVE.*

IT has been somewhere said, on the occasion of an allusion to codification of laws, that not less valuable would be a distillation, periodically, of literature,—the essence of books on a given subject being extracted, and codified in a new work, when all the others could with advantage be burnt. There may be some reason in this view. We would have public libraries instituted in far greater number than at present: *books* should be cheapened, or placed within reach of every one desirous to be instructed, or to be harmlessly amused; but the multiplication of *works* on the same subject, especially those which are professedly educational, is becoming an evil; and like multitude in an architectural competition, of designs which time will not allow to be examined, operates against the probability of wise selection. More industrious examination and collation of previously published works, on the part of intending writers, is wanted, to direct towards the character of new work that really may be required. Embodying the result, the new publication is justified: otherwise it must to a considerable extent encumber the way of progress, or its leaves have their fitting appropriation only to,—

> "Clothe spice, line trunks, or flattering in a row,
> Befringe the rails of Bedlam and Soho."

We have been called upon, of late, to notice several works on perspective, and have hinted at the applicability to some of those on the same subject, of a view such as is expressed here above. It is matter of fact that the majority of architectural students do not learn perspective from books: as we have shown, after becoming acquainted with the orthographic method of representation, or that by plans, elevations, and sections, they get conveyed to them their first lesson, and nearly all that there is in the science, in an hour; and if they falter afterwards, the reason is the having omitted to practise, or the inability to think consecutively, and to know by sight what is wrongly drawn. If books be necessary, for embodiment and preservation of the science,—or if they are useful in tuition under any circumstances,—time certainly is saved by the method common in offices; or the advantages in any other, involve the use of models as means in contradistinction to diagrams.

We have some difficulty in deciding in what category to place the present work by Mr. Ruskin, for we are very doubtful whether he has succeeded in his intention of making the subject clear to pupils in ordinary schools, or whether the demonstrations could be followed at all, without previous familiarity with perspective as commonly learned and practised. This results, of course, not from any want of truth in the mathematics as an adopted form of explanation, and equally, it does not from inability of the author to handle that or another method, or from any stint of labour on the present occasion. There is, however, want of perspicuity in his teaching, in several essentials. He himself refers to the possibility of his "hereafter" bringing the work into "better form;" but without improvement in points other than he mentions, the work cannot be found to "answer its purpose," or enable, as he says, the student "to solve perspective problems of a complexity greater than the ordinary rules will reach;" and in naming Cloquet's treatise† and "a series of illustrations of practical perspective now in preparation by Mr. Le Vengeur," he does not rightly pass over some of the recently-published English works which have been noticed in our pages. He says:—

"For some time back I have felt the want, among students of drawing, of a written code of accurate perspective law; the modes of construction in common use being various, and, for some problems, insufficient. It would have been desirable to draw up such a code in popular language, so as to do away with the most repulsive difficulties of the subject; but finding this popularization would be impossible, without elaborate figures and long explanations, such as I had no leisure to prepare, I have arranged the necessary rules in a short mathematical form, which any school-boy may read through in a few days, after he has mastered the first three and the sixth books of Euclid."

Now, in "the modes of construction," or "constructions" (to use Mr. Ruskin's peculiar phraseology) with which we are acquainted, we are not aware of insufficiency or difficulty. The present work would leave much of the difficulty which its author hopes to remove. In some important steps of the demonstration, as in what relates to the practical method of finding the "sight-magnitude" of objects on the "measuring line," and the use of "dividing-points," the want of clearness which we speak of is to be found; and the use of the term "sight-line" in lieu of *horizontal line*, and "station-line" for the line on which would be measured the direct distance of the picture or the object, is of doubtful advantage, considering that the former term would be very liable to be taken for what the author means by the latter, namely, the axis of vision or of the *cone of rays*. The success of the demonstration is further interfered with by want of precision in some of the diagrams, and by omissions of letters of reference. Draughtsmen and engravers are becoming thoroughly careless in these particulars. The opening of the work, and some portion of the Appendix, on the other hand, are clear in style and explanation; but this not being maintained throughout, though we ourselves have perused the work with interest, and can recommend it as a useful mental exercise, we doubt whether it could claim to be more than a vehicle for instruction *different* in sort from others, and as such, capable of improvement in several respects. In certain points, however, the scheme of demonstration would have great value as compared with any to be found in the catechisms and other works which formerly were used in schools. The actual dimensions of the object, the direct distance, the lateral distance, and the vertical distance, are taken to be the basis of the perspective representation Thus, as in the case of a drawing of a pillar, the actual object being supposed to be 42 feet in height, and the station-point 70 feet distant from it, and 5 feet from the plane of the picture,—"Then as 5 is to 70 so will the sight-magnitude required be to 42; that is to say, the sight-magnitude of the pillar's height will be 3 feet." Or in another case, taking the plane of the picture distant 2½ feet, the apparent height will be 1½ foot. That is to say, the sight-magnitude of an object is to the real magnitude, as the distance of the plane of the picture from the eye is to the real direct distance, in all cases of parallel perspective at least,—and although the object may be above or below the eye, or at any distance laterally from the direct line, or what the author calls "station-line." Moreover, it is likely that the method of demonstration in the work, could it be more clearly explained, would be of value in sketching: and at present, many of those who have commenced practice of perspective would find of service to them, the instructions on the methods of delineating circles and arches, pyramidal forms, the capitals and base-mouldings of columns, and the lines of gables, and of finding the vanishing-points of lines inclined to the plane of the picture. As a whole, the work is rather curious and suggestive, than one which could be put into the hands of architectural students with certainty of its standing them in stead of the instruction which they now derive by ready means; but if codification of the existing information in books be wanted, Mr. Ruskin shows that he could supply that want, and effect something beyond.

* The Elements of Perspective, arranged for the use of Schools, and intended to be read in connection with the first three books of Euclid. By John Ruskin, M.A. 8vo. pp. xii. 144. London: Smith, Elder, & Co. 1859.

† "Nouveau Traité Elémentaire de Perspective." Bachelier. 1828.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE ordinary general meeting was held on Monday last, at the house in Conduit-street; the president, Mr. C. R. Cockerell, R.A., in the chair.

The minutes of the last meeting were read and confirmed.

The following gentlemen were, on ballot, elected Fellows of the Institute:—Mr. J. K. Colling, Associate, of 6, Ridgemount-place, Hampstead-road; Mr. Thomas Allom, Associate, of Barnes, Surrey; Mr. Cuthbert Brodrick, of Leeds; Mr. Edward B. Lamb, of 3, Hinde-street, Manchester-square.

Mr. Charles J. Phipps, of 5, Paragon-buildings, Bath; and Mr. William S. Barber, of Hanover-chambers, Buckingham-street, Adelphi, were elected Associates.

The President, in reference to the election of Fellows and Associates by ballot, expressed his hope that in future members would not leave the room without voting.

Mr. Godwin observed upon this subject, that there could be no possible objection to members exercising their privilege of "black-balling," so long as the result of the ballot represented the general opinion of the meeting; but if gentlemen continued the practice of leaving the room before the ballot, a display of personal feeling on the part of two or three gentlemen might at any time exclude a very efficient and desirable member, whereas if the general body remained, the opinion of the great majority might be in his favour.

Mr. T. H. Lewis (honorary secretary) read a list of donations to the library, and called attention to some beautiful specimens of wood-carving by Mr. W. Perry, executed by desire of the Duchess of Sutherland, for a bath-room at Stafford House.

Mr. Wyatt Papworth then read a paper "On the Superintendents of English Building in the Middle Ages;" with especial reference to William of Wykeham, to which we shall return. One part of the paper was devoted to showing the reader's reasons for doubting the right of William of Wykeham to be considered the architect of the buildings with which his name was associated.

At the conclusion,

The Chairman said that he had heard with great pleasure the instructive and erudite dissertation of Mr. Papworth, upon a subject which to architects was invested with more than ordinary interest. The subject was one of great importance for the profession to pursue, and he was sure there were many gentlemen present who had, more or less, investigated it. He had himself done a little towards vindicating the fame and genius of William of Wykeham, and he was consequently a little disappointed at the estimate formed of him by Mr. Papworth. Born in humble circumstances, William of Wykeham succeeded in raising himself by successive steps to be, not only a high ecclesiastic, but to be the Lord Chancellor of the empire. Feeling strongly as he (the chairman) did upon the merits of William of Wykeham, and his claim to be considered not only a great Mediæval architect, but also as the originator of what might be termed a new era in the art, he would like to hear what gentlemen present might have to say in support of his title to those distinctions. It was, at all events, clear that if he did not devise the buildings imputed to him, he was a person of such cultivated taste and accurate judgment as to encourage the art in others, and earn a reputation for himself which time could not destroy. So versatile were his talents, that he appeared to have discharged many public offices of great trust and responsibility. He was made envoy to France, and he was subsequently able, when master of the Cinque Ports, to design a plan for fortifying these places. Such a man appeared to be wanted in the present day. In estimating the character and attainments of William of Wykeham, it was necessary to bear in mind that, at the period in which he lived, ecclesiastics were the only learned men of the day; and that, when they flourished, there were none of those *brochures* and pamphlets which now teemed from the press, to enlighten the multitude. Mr. Papworth appeared to have applied himself with great diligence to the subject of his paper: he had pursued his researches through seven or eight centuries, and had thrown much additional light upon an interesting and suggestive theme.

The Rev. MacKenzie Walcott warmly defended the claims of William of Wykeham, not only to the credit of works in Winchester Cathedral and Queensbury Castle, but also to be the author of a new style of architecture in this country. He regretted that Mr. Papworth should have called in question, by ingenious and elaborate speculations which he believed to be founded upon an erroneous theory, the fame of a man who had done so much to elevate the profession of the architect. He (Mr. Walcott) knew of no profession which should be so jealous of the reputation of its members as that of the architect, for if they did not set their face against any attempts that might be made to under-estimate their services, there would be no knowing when some speculative theorist might rise up and allocate the merit of their own designs to their pupils' room, or to their master mason. Sad,

indeed, would be the day for their country and their age, when England would become indifferent to the reputation of her sons, or tire of hearing her Aristides called "The Just." Mr. Papworth, in attacking the claims of William of Wykeham, had flown at high game, but he (Mr. Walcott) was persuaded that there were many who would learn with regret that he had ventured to disparage the merits of one who had been to them *in loco parentis*. Mr. Papworth had fallen into many errors in reference to William of Wykeham, and, among others, he said that he was born at Wykeham, in Wilts; whereas he was born at Wykeham, in Hampshire: he also declared that he had not been a Freemason, and quoted in support of his assertion a passage occurring in the reign of Henry VI., whereas Wykham had been dead some long time before. Mr. Walcott then proceeded to quote the opinions of Professor Willis, of Cambridge; and also of Mr. Cockerell (the chairman), urging that the former had declared that William of Wykeham was essentially a practical man, and one who had been engaged all his life in works of architecture; while the latter had given his opinion that he had never been sufficiently celebrated, and that the restoration of the Cathedral of Winchester proved him to have been a consummate architect and engineer. With regard to his will, he had the expression *novi operis facti per me*, which were to be intrusted to Master William Wynford and other discreet persons versed in their art; thereby showing that he had been the designer of the new works referred to. But to show that William of Wykeham was not the man to arrogate to himself credit which should justly attach to others, it would be found that in the stained glass at Winchester Cathedral were portraits of Thomas the glazier, the carpenter, and the chief mason, who had assisted in building the church.

Mr. Papworth said he had referred to the circumstance mentioned by the reverend gentleman, as it was far from his intention to detract from what he believed to be the merits of William of Wykeham.

The Rev. Mr. Walcott, in continuation, read a number of extracts from ancient records preserved at Oxford and at the British Museum, with the view of showing that a mass of contemporaneous evidence existed to prove that William of Wykeham devoted the greater portion of his life to the study and pursuit of architecture, and that he well deserved the high reputation which he had acquired as the most skilful and original architect of the middle ages. The rev. gentleman said that he was not sanguine enough to believe that he could convince Mr. Papworth, their Cato, but that, if he was successful enough to obtain the verdict of the meeting, he would console himself with the words, *Victrix causa mihi placuit, victor Catoni.*

Mr. Kerr remarked that they were always glad to hear the views of amateurs, and that they were indebted to the rev. gentleman who spoke last for his observations; at the same time it might be desirable to remind the meeting that the object of the paper just read was not simply to clear the biographical question, or to ascertain whether William of Wykeham was or was not what he was represented to be. What was far more important, was to trace the rise and progress of their own profession, and Mr. Papworth had incidentally selected the most prominent amateur architect, to test his merits, and thereby ascertain whether the class of which he was the representative was or was not what it was supposed to be. For his own part, he did not take that lively interest in William of Wykeham which the reverend gentleman near him did, but he had followed Mr. Papworth with great interest; for it was evident that the early history of the architect's profession was buried in great obscurity. In early times, the church was the only receptacle of learning, and consequently it was not unreasonable to suppose that ecclesiastics were also architects. It seemed to him that the distinctions drawn by Mr. Papworth as to the supervisors of buildings, opened up an extremely useful subject of inquiry, and he hoped that he would follow it up on a future occasion. But that which architects as a body wanted to know was, not whether William of Wykeham was what he was represented to have been, but how it was that the beautiful in art arose in this country out of the mediæval system. At the present time it was fully recognized that there was a profession for the designing of beauty in buildings. What the substitute might have been in the middle ages was a point upon which opinion might differ, but it was, at all events, clear that a condition of progress had developed itself, out of which the architect of the present day arose, though it could not be said that he was even now full blown. This appeared to him to be the real subject which the paper was intended to elucidate, and with every desire to acknowledge the superior antiquarian lore of Mr. Walcott, he (Mr. Kerr) felt that he could not allow his observations to pass without saying a word in defence of the paper by Mr. Papworth.

Mr. Street said that it was with much diffidence that he rose to oppose a paper so carefully prepared and so instructive as that which Mr. Papworth had submitted, and for which all Gothic architects had reason to be grateful to him. He confessed, however, that in his opinion Mr. Papworth's arguments were inconclusive, and had been answered by the Rev. Mr. Walcott, who had shown that the architects of the Middle Ages had been described at the period by a variety of names, used indiscriminately. In proof of this, it should be remembered that William of Wykeham was himself clerk of the works before he was an architect; but leaving the case of William of Wykeham, he should like to call attention to an older artist, to whom Mr. Papworth had done but scant justice—he meant Elias of Dereham. Mr. Papworth had dismissed him in six words, although Mr. Pugin, on apparently good grounds, had claimed for him the credit of being the architect of Salisbury Cathedral. Elias of Dereham appeared, like other architects of his time, to have been variously named, and to have undertaken a great number of duties, for there were entries that he was to make or enlarge a window in the castle of Winchester, which was to be painted of a green colour, and that he was to give the disposition of it, as also to give directions as to the decorations of one of the king's chambers. He was a canon of Salisbury, and, as he (Mr. Street) believed, the architect of the cathedral. He was present at its consecration; the bishop appeared to have had great confidence in him, and as the king was present at the consecration, it was most probable that the architect was there introduced to him, and that his subsequent employment by the king was to be traced to that circumstance. It seemed to him (Mr. Street) that if Mr. Papworth had not confined his remarks to England, he might have arrived at a truer knowledge of the architects of the Middle Ages. The ordinary title of a Continental architect, from the thirteenth century downwards, was MAGISTER OPERIS, as shown by the inscriptions on their tombs at Rheims, Amiens, and in the church of Notre Dame, at Paris. The architects in those days appeared to have arranged the whole of the work; but as time passed away, and the art of construction became better understood, tradesmen were called in to do separate portions of the work, for which it was to be presumed they were held responsible. With reference to the claims of the clergy to be regarded as the chief architects in the Middle Ages, there could be no doubt but that many of them were entitled to that description; but, on the other hand, many churches were erected (Amiens Cathedral, for instance) by laymen. In England, however, the probability was that the majority of architects in the Middle Ages were clergymen. William of Sens and William the Englishman, of Canterbury, were also laymen. William of Sens, when engaged upon Canterbury Cathedral, fell from a scaffold, and being incapacitated from conducting the works, deputed a young monk who had shown great taste and skill in architecture to represent him, and this ecclesiastic continued to discharge his trust until, on the removal of William of Sens to the Continent, for the restoration of his health, he was succeeded by William the Englishman. With regard to the general absence of all trace of the working drawings used in the construction of the cathedrals raised in the thirteenth and subsequent centuries, he wished to state that on examining the roof of the Cathedral of Limoges, he was struck by finding the outlines of the columns and other parts cut on blocks of granite.

Mr. Ferrey expressed his hope that the subject to which Mr. Papworth had called attention would receive further consideration on a future occasion, as it was almost distressing to find the traditions which they were accustomed to regard with so much admiration and veneration so ruthlessly demolished. With regard to William of Wykeham, the bare supposition that he was not the designer of those magnificent works associated with his memory, was distressing to every Englishman, and more especially to those who claimed to be natives of the county in which he was born.

The Chairman said he quite agreed with the last speaker as to the desirability of renewing the discussion on a future occasion, as it was of great importance to them as architects to learn the history of their ancestors, from whatever source they might have sprung. It was also desirable to collect all the proofs that could be accumulated on so interesting a subject, and he was convinced that their accomplished friend Mr. Papworth would be glad to receive any hints which their collective learning and research might bring to bear with reference to the theme which he had brought under their consideration. The subject was of too great importance to be disposed of in the limited period which could be devoted to one evening's discussion. He hoped, however, that their friend Mr. Ashpitel would favour the meeting with his opinion.

Mr. Ashpitel said that at so late an hour of the evening little time remained to discuss so large and interesting a topic as that to which Mr. Papworth had invited attention. With reference, however, to the issue raised, and which Mr. Walcott had met with so much vigour, he might say, with that respectable authority in the *Spectator* that "a great deal might be said on both sides." They were, for instance, accustomed to hear that such and such a building had been built by Wolsey, although it was well known that the great cardinal was no architect at all; and, on the other hand, they were taught to believe that certain structures of great beauty had been raised by William of Wykeham, who had devoted his whole life to the study and pursuit of architecture. It did not, however, follow that because no buildings had been constructed by Wolsey the wreath was to be taken from the brow of William of Wykeham. Then with regard to the designation of the architect, it should be remembered that a good deal depended upon the state of civilization at the time in which he flourished. In a low state of civilization the man who built a hut might be described as "Carpentarius;" but, again, in periods at which civilization had attained a high pitch, the architect was found, as in the case of Vitruvius and others of ancient Greece, occupying a position and taking rank with the jurist-consuls of his age. That the title by which the architect was known was not to be considered as derogating from the dignity and importance of his office, was proved even in modern times by the fact that the architect of royalty was called the "clerk of the works," and that until five or six years ago their friend Mr. Bunning, who held the office of architect to the corporation of the city of London, was described by the same humble designation.

Mr. Digby Wyatt said that he could supply in his own person a still more modern illustration, as he himself had the honour of being "clerk of the works" to the East-India Company.

Mr. Ashpitel, in continuation, observed, that whatever might be the position of the architect in the present day, the fact that William of Wykeham, the son of a poor man, had sprung from the ranks of the lower ecclesiastics to the position which he successively occupied as Bishop of Winchester and Lord Chancellor of the empire was in itself sufficient to show in what high estimation the study of architecture was held in his day, and with what honours the man had been rewarded who had struck out a new style of architecture.

Mr. Digby Wyatt observed, that although some difference of opinion might exist as to the conclusiveness of the arguments raised by Mr. Papworth, they must all acknowledge the labour and research which he had shown by the collection of his facts and historical data. With regard to the actual architects of Mediæval times, they must all admit that the subject was involved in obscurity, and that great credit ought to attach to those who might endeavour to penetrate that gloom, and bring additional light to bear upon the subject. As Mr. Papworth had applied himself to that task he was entitled to their acknowledgments, and he therefore begged to move that the best thanks of the meeting be awarded to him for his able and erudite essay.

Mr. Godwin briefly seconded the motion, which was put from the chair and carried by acclamation.

BRIDGE OVER THE ELBE, NEAR HAMBURG.

THE gigantic bridge to be constructed over the two arms of the Elbe, between Harburg and Hamburg, will have a total length of 3,300 feet. The left arm is 2,000 feet broad, and is to have six arches each, of 333½ feet span. The superstructure will be 6 feet, and the rails 9 feet, over the highest tide level imaginable, or 18 feet over the ordinary high-water mark. This height is more than sufficient for the river navigation. The second bridge over the light arm will be 1,300 feet long, and consist of five arches of 325 feet each. Each of the bridges is to have a double line

of rails, also a footway for pedestrians. A canal, constructed round the railway station, and put in communication with the higher Grasbrook, will keep open the communication with the Upper Elbe. The Hamburg station will occupy 2,250,000 square feet: three sides will front the river, and the other look towards the town. The passenger station is to stand on 16,000 square feet. Six goods sheds, 50 feet wide, of a total length of 1,800 feet, are to receive goods coming from the land side. The vessels navigating the Upper Elbe will discharge their cargoes on quays on the east and north of the station. The south and west quays are for sea-going vessels, and have 16 feet of water above low-water mark, for a length of 3,340 feet. Warehouses of considerable dimensions are to be hereafter constructed.

COLOURED MATERIALS IN EXTERNAL DESIGN.

THE ARCHITECTURAL ASSOCIATION.

THE ordinary meeting of members was held on Monday last, at 9, Conduit-street; Mr. Penfold, president, in the chair.

Mr. J. Johnson read a paper on Coloured Materials, considered principally with reference to their application to external design.

MR. CHAIRMAN AND GENTLEMEN,—Some few years back the introduction of colour to our buildings, externally, was hardly thought of. It would have been considered inconsistent and out of place. The necessity, however, for some improvement in our street architecture has caused many eminent men to take the matter in hand; and very much has been said and written to induce architects to study the subject of coloured materials as applicable to external design, and to make use of them in their works.

It is with considerable hesitation that I venture to bring this subject before your notice, because it is one which has been so well written upon, and that, too, by the most eminent men of the day, that it can hardly be expected that I should be in a position to add anything new to what has already been said at different times by others. I profess only to introduce the subject for your discussion,—to put together as much information bearing upon it as I have been able to obtain by reading and observation, as far as my memory will serve me, and thereby to excite a further interest in, and, if possible lead to a more general use of, coloured materials, both externally and internally.

The use of colour for internal decoration is universally recognized. No apartment is considered complete without it. Form is not sufficient in itself, and painting is the means usually employed to give effect, and render internal apartments pleasing and satisfactory to the eye. There are many other ways, however, by which *variety* is obtained for internal decoration. Plastering, papering, and furniture, all add to and increase the effect. These are resources at every one's command, and can be altered or varied according to the taste of individuals.

Then there are imitations of natural materials on inferior substances often introduced very skilfully in the representation of the most beautiful woods, marbles, &c., in every variety. Many writers have condemned this mode of finishing as false and inadmissible, where *truth* is to be regarded in building as in other things. It is difficult, however, to carry into practice many of the theories put forward, even though the arguments in favour of these theories seem plausible, and at the time almost conclusive. For my part, I admire and respect this manifestation of truth in building. I should be glad to see it universally adhered to; and I wish that the desire to obtain so much for money was less universal: we might then hope that our ornamentation would be more genuine than it now is. I fear, however, that this will never be entirely accomplished. We have now become so accustomed to admire what is false of a superior order, for the sake of ornament, in preference to that which is genuine of an inferior order, that we shall never be able to do without veneering, graining, and the various other imitations of the present day, in some degree.

When anything becomes general, and is understood only as imitation, it is said to be no deception. It is said that the gilding of wood or other material is quite legitimate, because it is no longer understood to mean that the whole of the substance is gold, but that the gold is only a film put upon some other substance for the sake of giving a more brilliant finish. It must be remembered that this film or outer coat of gold is genuine.

If this species of ornamentation be allowable in one material, although that be very costly, it seems to me that it is pardonable in any other so long as it is understood. For this reason we must admit veneering to be legitimate, and in many instances stucco and cement, if not graining.

When imitations are resorted to, there are three general conditions, which, I think, should be observed. I quote them from a paper read at the Architectural Institute of Scotland by Mr. T. Purdie. They are—

"1. That they be not employed where the material represented would of itself be out of place or inappropriate.

2. That no object be painted in imitation of one material which, from its form, construction, or application, was obviously or necessarily composed of another.

3. That no imitation be employed in positions where we are entitled to expect that the real material should be used, or where the discovery would create disappointment."

In connection with painting as applicable for internal decoration, the rules observed in the chromatic decoration of the New York Crystal Palace are the most concise and useful I have met with. They are:—

Rule 1. Decoration to be subordinate to construction in all cases.

2. Features of main construction to be of one prevailing tint.

3. The prevailing colour of ceilings sky-blue, the monotony prevented by the introduction of orange (the natural complement of blue).

4. Rich and brilliant tints, in small quantities, to be employed to attract the eye to the articulations and noble portions of the members, rather than to the members themselves.

5. All natural beauty of colour existing in any material should, if possible, be brought into play by using that colour itself, instead of covering it with paint of another hue.

6. All ornamentation to be consistent with the construction.

7. White, in large quantities, in all cases of simple composition, not only to give value, by contrast to a few colours employed, but to reflect light and cheerfulness to the work.

Let us now consider how far the real materials (generally imitated only) may be introduced in ordinary designs, and how far materials of an inferior order may be made beautiful in themselves, without there being any necessity for covering them with veneers or painted imitations.

I believe that there are beauties in many of the materials commonly used in the construction of buildings, which may be made to tell in the general design, and produce an equally pleasing and more truthful effect, if properly and carefully arranged, than by any amount of imitation; and when materials, although superior to others in their beauty, of themselves, cannot be introduced on account of expense, those used do mostly possess sufficient beauty, and may be made to substitute them in design as well as construction.

When sufficient funds are allowed the architect or designer there is not so much difficulty. There are abundant resources in nature. We find materials of almost every variety of colour and tint. Marble, stone, and wood are to be had in infinite variety; and when wrought into finished and polished surfaces are most beautiful, and far superior to any painted surfaces which the ingenuity of man can invent or the skill of the artist can execute.

Colour is also made successfully to form a part of our artificial manufacture, as brick, tile, and the ceramic art generally.

We have recently seen some very successful applications of natural materials, both as to colour and form.

No one has, I think, visited the new church of All Saints, in Margaret-street, without being struck with the extraordinary and beautiful effect of the decorations. It is universally admired by persons of acknowledged taste; and those who have no pretensions to art are able to see that there is a superior beauty to that which they are accustomed to. It must be because the colour of the natural materials is superior to any kind of painted decoration. Yet all the materials used are not of a costly character. Some of the most simple and inexpensive are introduced. Brick, tile, deal, &c., are used, and no attempt to conceal them.

Who would wish that the stained deal should be painted in imitation of oak? or that the other materials of a less costly and inferior order should have been painted over instead of their natural faces being exposed to view? There are beauties in all the materials used. The inferior serve to set off, by comparison, the more costly, and increase the effect. How much greater is our admiration when we can see that the materials used to produce this effect likewise show us the construction, and convince us that all this splendour is not artificial, but real and lasting! This mode of decoration is one which I think should be well studied; and although the limits generally to the expense of other works will not admit of such costly materials being introduced as in the example just named, still a great deal may be done with simple and inexpensive materials; and, by well studied and careful arrangement of natural colour and effect, as much truth may be expressed.

I think the same rule may be carried out to a great extent, and that successfully, in the internal designing or finishings of our domestic architecture.

Why should light and dark woods be commonly used, in combination with each other, in our joinery? Wood may be stained of various shades from light to dark. The dirt or dust does not show more on stained wood, than it does on paint, and can be as easily cleaned and refreshed by periodical coats of varnish. Those parts subject to constant wear and tear can be protected by more durable material, such as finger plates, &c.

Doors made up of light deal panel, with darker material for the rails and styles, or varied in the staining, would, I think, look as well as the ordinary graining. Good and well-seasoned materials would have to be used, and the joiners' work well fitted and constructed. Mouldings of a superior character, and in some cases gilt, might be used for the panels, &c.

Dark and durable woods might be used in parts most exposed to wear and tear.

Treads of stairs might be framed with oak nosings, if not at first, at least when necessary to repair the nosings.

Skirtings varied by using dark and hard woods for the lower part or plinth, lighter wood above, and finished with superior mouldings.

Window boards and nosings of oak.

This must be taken as suggestive only. It would, undoubtedly, be more expensive than the common method of painting, where extreme cheapness is required; but I think it would in many cases be better than graining, and cheaper in the long run.

I must not dwell on the improvements that might probably be made to apartments internally, by the substitution of real coloured materials in place of painting or other methods.

My purpose this evening is to draw attention more particularly to the use of varied colouring in buildings externally, and to notice the means at our command for furnishing these colours, so that they shall be durable and lasting under all circumstances of locality and atmospheric changes.

With internal decoration, it is not a question as to the advantage of colour over mere light and shade. No one seems to dispute that. The colouring, not being subjected to atmospheric changes under these circumstances, retains its brilliancy for a length of time. Painting is sufficiently durable, and when used consistently is a very valuable accessory. Still I prefer a natural face for finished surfaces, whenever it can be obtained.

With external decoration it is very different, and one can hardly wonder that there should be a diversity of opinion as to the policy of introducing colour in varied forms externally; lest, through it not being properly understood, it be carried to excess, and assume a gaudy and vulgar appearance.

Much depends on the surrounding objects in the locality before we can be satisfied that the result will be harmonious. If applied in the form of painting, the constant and necessary periodical re-painting is objectionable, as well as in many cases hiding the construction.

Fortunately nature has given us an infinite variety in materials, suitable for building purposes, both as to colour and tint; and our manufacturers have now discovered how to introduce different colours into the various artificial materials, so as to form part of the material with which it is amalgamated, and be permanent and lasting.

Objections have been raised to the use of different materials in combination with one another, for other reasons more important than mere effect. It has been said that you cannot obtain a uniform resistance by such mode of construction. The action of the atmosphere varies in its effects on different materials, and is thereby calculated to injure the strength and solidity of the building to some extent.

If an inferior material be strong and durable enough, there can be no harm in using a stronger and more durable with it, so long as we take care that the weakest material used be sufficiently strong in itself to bear the pressure.

With regard to atmospheric influences, there is, perhaps, more to be considered. Where many different materials are used, great care should be taken in the selection, both as to their constructional qualities, and to the action of external influences upon them.

It has hitherto been the custom to follow the marks of the ancients to a very great extent, and we undoubtedly owe much to them for what they have taught us. If we could have been sure that they were in the habit of painting their edifices externally with varied colours, there would have been many who would not have hesitated to follow their example.

It has, however, been recently discovered that the Greeks did use colour in their temples externally, in parts protected from the severity of the weather, evidently showing their regard and appreciation for polychromy, and that they never hesitated to use it where they could do so without its being injured by external influences.

The writer of the article "On Architecture," in the *Quarterly Review* for October last, says that "One of the observable features in Assyrian architecture was the general use of the most brilliant colours in the *exterior*, and throughout the interior, and the importance attached to such accessories as gardens, trees, spacious courts, and splendid decorations, hangings, and carpets. They were more considered than rich and costly constructive materials, granites, marbles, and great hewn stones."

Mr. Fergusson says "that the great monuments of Babylon and Echanta, built after the fashion of those of Assyria, were painted on the outside, we know from history. Ample traces of colour are found on the interior walls, and on the sculptured slabs in the Assyrian ruins, to show that the whole of the inside was similarly decorated. As the love for over-ornamentation increased, it was gratified by a superabundance of carved stonework. The use of colour decreased until it was abandoned altogether in the corrupt Roman architecture from which we have principally derived our taste for, and knowledge of, what we call the Classic styles. The æsthetic law which calls for the union of painted decoration with all original architecture was as much observed in India as in the temples of Greece and in the churches of Mediæval Italy."

The buildings in Germany, and other parts of the Continent, have often been admired for the beauty of colour in the roofs, &c., by the use of tiles and similar materials. We know, too, that buildings constructed entirely of red brick, where they are erected in the country, and isolated from other buildings, do often harmonize and look well with the surrounding scenery.

In country villages, where houses are sometimes covered with tiles, and in many cases with thatch, and built with brick and stone indiscriminately,—where irregularity of outline is permitted instead of plane faces and regularity,—in many such villages the effect is most picturesque and pleasing, both from variety in colour and variety in outline. This irregular appearance is mostly seen at a little distance off to great advantage.

There are many instances in which coloured materials, used in large masses, have a most charming effect. Of course this is accidental, and not designed. The question of colour in these examples was rarely taken into consideration in the original design. The materials of various kinds were used on account of their suitability for the purpose; but may we not learn something, from these results, which shall guide us in the use of coloured materials generally?

The minute variety which can be applied to town-houses, where the eye is mostly brought within a short range of the object, and can only take in but a very small portion, comparatively, at the time, would look spotty and meagre in country buildings where the range of vision is so much more extensive. It would, therefore, seem desirable, in the building of a cluster or number of houses in parts out of town, to arrange the different tinted or coloured materials in larger masses.

A house built with stone, or light-coloured bricks, and roofed with red tiles, would, perhaps, look well by the side of another built with red bricks and covered with slate. Different coloured bands, patterns in roofs, &c., are, in my opinion, very often out of place, when used to too great an extent in country villas or other buildings, because they are rarely so close to one another, or in such continuous rows, as to render it impossible for the spectator to see anything else but the wall surfaces; and, therefore, the effect with the adjacent scenery, as seen from a little distance off, is the most important to be taken into consideration.

In town-houses the case is totally different: here we are generally close to the external walls in a street, perhaps, hemmed in by continuous rows of walling on both sides. The only relief,—unless the rows of houses are considerably varied by form or colour,—is in the colours of the sky and clouds, in which we mostly have some complement to the colours of bright materials: beyond this we can see but little of nature's arrangement in colour. Everything is shut out by the continuous rows, and number of buildings, which crowd our cities and thoroughfares. We should try, then, to arrange our buildings either in form or colour, so that they shall be pleasing, to the eye, and satisfy us in some measure for the loss of that variety which we are accustomed to see in the works of nature.

There is much diversity of opinion abroad as to the advisability of polychromatic decoration externally. No doubt it has sometimes been injudiciously employed, and those who are prejudiced and opposed to it have condemned many examples with unmerited severity.

It is well, however, that all errors and follies in any new movement should be pointed out, and that others should be warned of making like mistakes.

It will not do to regard what every one may say. There are many persons who cannot appreciate colours, as also

there are persons who cannot appreciate music. For many, music and colour have no charms,—may perhaps, in some instances, be revolting to their taste altogether; but that is a defect in themselves, and not the fault of the colour or the music. There is such a thing as "colour blindness," and there are some curious facts recorded, of persons, who are deficient in the faculty of distinguishing colours. It is said to exist in one male out of twenty. "Professor Wilson discovered one case in thirty-seven out of the Edinburgh students. Not merely false vision, but literally colour blindness. They doubted about all colours, and on different occasions named the same colours differently. White and black they had no difficulty about."

We know that music and painting are generally appreciated and admired by the public. It is because the mind is consecutively and rapidly engaged with different impressions, from the variety and harmony of the tones or colours presented to the view. I believe that is what is wanting in our street architecture, and being compelled to have so much wall space to the fronts of our buildings, that materials of varied colours and tints afford the best means of effecting the object.

There are few persons but who admire the effect of an assembly on any festive occasion. The brilliancy and variety in the colours of the dresses, as well as the form, gives a pleasing result to the spectator. No matter whether in the church, the theatre, the concert-hall, or out in the open air, large concourses of persons give brilliancy, and add greatly to the beauty of the scene. Of course, this, again, is accidental; but then it proves the universal admiration of variety in colour as well as form.

We see that the two principal things to be considered, in making architectural designs, are form and colour. The more important is, undoubtedly, that of form. It is by the many varieties in form that we obtain the pleasing effects in light and shade, which break up all monotony and give beauty to the design.

We know that the mind, when active, requires to be constantly occupied with fresh thoughts and scenes. We cannot dwell on one subject or form, long together, without being tired by the continuance of one train of thought. In such a condition the object becomes monotonous, and monotony is the most wearisome of all things to the human mind. Alternate action and repose are required. We cannot bear to be looking on continuous wall surfaces, unbroken by form or colour, any more than we can bear listening to the continuous repetition of one note or sound in music.

A well-known writer (Mr. D. Wyatt), says, generally, "That the endless diversity of men's tastes, and the ever-changing condition of their education and association of ideas, demand for their productions a *variety* almost as incessant as that which pervades creation;" but he goes on to say, "Whenever that craving after variety has been gratified irrespective of fitness, novelty has degenerated into frivolity, design into conceit, and style into mannerism and vulgarity."

In all cases variety should be consistent with fitness in the construction.

The same writer says, with regard to form, that it is in nature "an index to all leading attributes,—a clue to recognize the relation of bodies, or their properties, to one another. Thus from form alone to discern at a glance of what materials, and how any particular object examined has been executed."

In Weale's "Rudimentary Treatise on the Principles of Design," the author says that "forms may be divided as regards their inherent or essential expression (apart from association) into at least five classes, according to their degrees of contrast and gradation; from the most grand, severe, and forcible, to the most elegant, fanciful, and delicate.

Thus we may arrange—

1. Rectilinear and rectangular forms.
2. Rectilinear and oblique angled forms.
3. Curvilinear forms without contrary flexures.
4. Curvilinear forms with artificial contrary flexures.
5. Curvilinear forms with natural contrary flexures.

"It may be taken, then, as a principle hardly admitting of question, that as in nature, so in art, the grander and more forcible varieties in forms should in every case prevail most in the ruling and structural parts of a work, and that the more elegant varieties should find their place chiefly in ornamental details."

In buildings generally all projections and recesses, all variations from straight lines and flat surfaces, constitute that kind of form which gives shade to parts recessed, and leaves projected portions light. When the architect has space at his command he is enabled to vary the outline of his design, to break up all flat surfaces, to introduce a variety of forms, and by so doing has less difficulty in producing a design that shall be generally agreeable and satisfactory to the eye. So far detached buildings, and buildings in which the line of frontage is continually broken, may be arranged generally satisfactory as to external design entirely by variety of form without the aid of colour, although there are few cases in which colour may not be made to assist form in some degree.

In street architecture of the present day, however, there can be but few and small projections from the plane of frontage, and it rarely occurs that any other recesses than those formed by the necessary doors and windows can be obtained. Ground has become too valuable and the line of frontage too important. The Building Act imposes many restrictions, and few clients can be induced to sacrifice an inch of frontage for the sake of external design. It must be something more important than mere "politeness" in building to make them do so.

It follows, therefore, that in most modern street architecture, there must of necessity be a great quantity of flat wall surfaces. String courses, architraves to windows, and mouldings, generally, can be very usefully introduced. Panelling may, perhaps, also be resorted to very advantageously in some situations. These accessories mostly involve considerable extra cost, whether executed in the real material, or plastered on with stucco. If executed in stucco, they are certainly not what they represent. I think they are better left out, if the proper material and construction are too expensive; and that plain projections and the use of colour will supply their places. I would sooner see a building without these ornaments altogether than have them stuck on with plaster. If executed in the real material I admire them, and they, doubtlessly, serve an important purpose in long rows of buildings by breaking up the wall surfaces, by casting shadows over the fronts, and thereby helping materially to destroy the monotony; but in either case they do not break up the surface sufficiently themselves, and some other resource seems necessary to compensate for the loss of variety in forms, and consequent want of light and shade throughout.

If we must sacrifice many of the advantages of form, let us study how we can atone for that sacrifice, by making ourselves well acquainted with the laws and harmony of colour, so that we shall not be afraid to apply it externally as well as internally, in the use of such materials as are required for the construction, especially for town houses. Let us get all the variation in outline we can, and then make up for the deficiency by the application of colour in *varied surface forms*.

I am one of those who believe that our street architecture will eventually be very much improved by the use of coloured materials. It seems to me just what is wanted for our present requirements.

The spotty and streaky appearance, complained of by some, wears off by a few years' exposure to the weather, and is not objectionable where the variation is not carried to too great an extent. In time it becomes less marked. The variety in colour is only brought out prominently in those parts we are near to. In the distance the colours become neutralized, and, unless a very great quantity of positive colour be used, do not appear too prominent.

It, therefore, becomes an important question for our consideration, and is a subject which I think should be frequently brought forward and discussed in societies of this kind, in order that many opinions and more general views may be obtained. It is by such means that a proper taste is likely to be cultivated. Errors and follies will be pointed out and avoided, and general observation and experience will lead to a correct appreciation of what is worthy of merit in all new works. The effect of the atmosphere upon, and the durability of, the various materials is also an important matter for observation. It is by these means—by real practical experience—that we must look for progress in this as well as other things. We may then hope that the right use of coloured materials in external design will be properly understood, and that further improvements will be made in our artificial manufactures as their use becomes more general.

I do not think any regular or complete set of rules could be laid down for general guidance, at any rate not at present. We must learn by experience first. It may, perhaps, be at the expense of some few errors; but that has been the case with almost everything else. The improvements made in engineering and other sciences have only been arrived at by experiment. The first experiments have often been failures, but it is from the failures of our own or others that we frequently owe our success.

The great danger which we are liable to in introducing colour to our brick buildings, is in the too free use of the positive colour red. It is a most useful colour, when properly applied; but it should be used in small quantities, and always be balanced by the use of the secondary and tertiary colours in the larger masses, as recommended by Mr. Owen Jones and others. It will rarely fail then to assist in the development of form and light shade.

If due care and attention be paid to the few rules laid down for the use of colour generally, I don't think that any serious errors need be made. They will be found to apply, and serve to assist us in many instances in arranging colour externally as well as internally.

I should be sorry to see London or any city built entirely with variegated brickwork, although I think that would be a great deal more tolerable than the dull and dingy monotony of yellow or stock brickwork, without any variation in colour, which has accumulated to so great an extent in our streets and principal thoroughfares.

We are never likely, however, to have such a universal application of coloured brick houses. In the larger and more important buildings, stone and other superior materials always have been used; and where the funds will allow, and the importance of the case demand, I should always be in favour of the best materials, both as to appearance and stability, which we have at our command. But here we have, perhaps, more scope for variety than with coloured brickwork. With different coloured stones or marbles we can get almost any amount of variety. We can obtain it either by reducing the colours to mere variation from light to dark, or by making the colours very forcible and distinct. In the former case this has been done; in my opinion, with most perfect success, in the Crown Life Assurance Office erected in Bridge-street, Blackfriars. I should like to see a street carried out entirely in this style. I think there could be no greater improvement in our street architecture. The Venetian Gothic—or secular Gothic—adopted is a style very suitable, in my opinion, for introducing variety in colour; but I must not enter into the question of style. The mixed colours and tones in the example I have just referred to are of the most subdued description throughout. There is a most beautiful variety, affording all the repose necessary, and yet a total absence of anything glaring, offensive, or vulgar.

I have prepared a few rough sketches to suggest some of the many ways in which variety may be attained by the most simple forms without the aid of colour. Had time permitted, I should have been glad to have worked these out into more finished illustrations. I hope, however, that what I have brought will be sufficient to excite an interest in the subject, and lead to other designs being made by some of the members of the association. I feel sure that brickwork may be arranged with much greater variety in form than many believe, and that too in the most simple manner, and without unnecessarily increasing the expense, or destroying the bond of the work.

A dozen of the most simple forms in cast bricks, as suggested by the diagrams, would be sufficient to obtain all mouldings necessary. They need only be applied, like strong or positive colours, very sparingly; in such places as labels to windows, above and underneath string-courses, where the projection is sufficient; also in one or two courses at the impost of doorways and window openings, as suggested in sketches; and more freely perhaps in the principal cornice or crowning member of the building. All other necessary variety in form may be obtained by the use of plain and chamfered bricks; and where extreme cheapness is required, cast or moulded bricks may be dispensed with altogether. Many of the new police stations are good examples of what may be done with plain brickwork, by simple arrangements in form, without any varied colouring.

There are many ways in which different forms may be obtained without any projection from the surface of the front. [He then referred to some sketches, which were intended to convey the idea, and showed a varied outline by projections or corbelling under the lintels the reverse way, *i.e.*, from the sides of recesses.]

This kind of variety of form is suitable for surface decoration and where colour is to be employed. It is less liable to interfere with the bond than projections from the face of the work. Strings, and any kind of longitudinal projection, may always be resorted to with safety, proper bearing being all that has to be considered; but any continuation of vertical joints must destroy the bond of the work, and thereby injure the stability of the construction. For this reason I should never like to employ any vertical projection, beyond the size of a couple of bricks in height, at or near to the principal angles, or where there is likely to be much pressure, in case of fracture. I think the representation of quoin stones, as to size, is not good construction. They are generally arranged in three and four courses, forming a series of vertical joints, and destroying the bond where it is most essential. Such construction involves extra thickness in the walls. . . . I see no objection to the employment of strings, projected round the heads of window openings, if those openings be not too near the angles; because here the bond is already broken by the window opening, and the width of a string cannot add much further to the weakness of the work.

It now remains for me to say a few words with regard to the illustrations of the application of colour externally. If any gentleman present should be disposed to look at the sketches after the meeting, I may mention that the numbers to the sectional parts refer to the diagrams on sheet No. 1.

As, for reasons I have before named, we cannot always get sufficient variety in form, to prevent our street architecture having a monotonous and wearisome aspect; and that a multiplicity of small forms appears frivolous, and is almost as offensive and vulgar as gaudy colouring. I contend that we should try to use colour in our street architecture externally, as an assistance to form—which is the way we find it in all the works of nature. It may be applied in many ways, and serve to define a variety of surface forms, which shall harmonize with any solid forms it may be possible to introduce.

Illustrations were given as to how two different colours may be arranged in arches to window openings. This is an example from a window at Verona, copied out of Mr. Street's work on brick and marble architecture of Italy. This method of arranging colour according to the courses of the bricks, may be applied to cornices and other details I think with considerable effect. Circles and diamond patterns of different coloured bricks can be introduced in half-brick rings and lines, without materially affecting the bond. A running pattern, as shown on a sketch, would perhaps look very well under a cornice, or elsewhere.

There is an arrangement of colour in the gable ends of the tower to a church in Lambeth; I believe by Mr. Teulon. It consists of a geometrical pattern of three circles filling up the gable. Within the circles are two triangles, placed reversely, intersecting each other, thereby forming a hexagonal figure in the centre of each. This is filled with stone, and pierced to form a light. It is to my mind a very happy arrangement, and shows one of the many ways in which colour may be applied externally.

The new church and parsonage-house of St. Thomas's, Lambeth, near the Westminster-road, also shows a very great variety in the arrangement of colour and form in brickwork.

According to Monsieur Chevreul, 13 and 14 Prop., "colours on white ground appear darker; on black ground, lighter."

"Black grounds suffer when opposed to colours which give a luminous complementary."

It is important always to bear in mind such propositions as these. With proper attention to them black and red bricks may, I think, be used in combination with each other very advantageously.

[Illustrations were given showing the arrangement of black bricks on a red ground, and the reverse.]

I think black bricks have been very judiciously introduced in a new building of Messrs. Lee & Lavers, in Endell-street.

Having thus directed your attention to a few prominent features in this interesting subject, I trust that they may be considered of sufficient importance to elicit a few remarks and suggestions from the members present.

At the conclusion,

Mr. Hewitt said he agreed with Mr. Johnson that the principal obstacle to the introduction of moulded bricks was the difficulty of procuring them, as it did not answer the purpose of manufacturers to keep them. A few years ago, when there was a duty upon bricks, the manufacturers pleaded that circumstance to account for their not making them; but, since the abolition of the duty, there appeared to be no improvement. Perhaps the reason was, that the demand for coloured bricks would not warrant the expense. If the brickmakers would produce samples for coping and gable stones, they might be found to answer. To use colour in the manner suggested by Mr. Johnson required experience, and he did not feel himself justified in offering an opinion upon the subject.

The Chairman said that Mr. Johnson had dwelt at some length upon truth in architecture, for which he (the chairman) had himself been always a stickler. They might read a great deal about these truths, but the simple question was, what was the use of graining or veneering? Was it to render materials more beautiful, or to signify that there had been an expenditure of money? Was it to denote that they had offered to the lamp of Sacrifice or the lamp of Beauty? It then became a question whether the grain of oak was better than that of deal: in that case there would be no harm in graining a deal door, for no one who would see it would consider that it represented a falsehood. He differed from Mr. Johnson in his opinion as to the application of colour to country houses. Mr. Johnson did not approve of colour in the country as much as in town, whereas he (the chairman) thought that colour could not be so successfully applied in town, unless in cases where the architect built the whole of the street. Moreover, it should be remembered the smoke and atmosphere of large towns would speedily deface colour. While referring to this subject, he might be allowed to recommend the study of "Street on

Italian Architecture," which would be found an excellent guide to any one pursuing this study.

Mr. Hall remarked that the introduction of coloured bricks was a feature in architecture which had not received from the profession the attention it deserved. In some parts of the country, in Cambridgeshire for instance, where bricks only were to be had, coloured bricks were being introduced, from forms made from the designs of the architect. The bricknaker lived at Wisbeach, and he had produced some Gothic tracery by working simple geometrical patterns. In Belgium many churches were made entirely of brick,—mullions, tracery, and all. With regard to colour blending, it was quite true that many persons could not distinguish yellow from green or green from red, and he had himself known cases in point; but whether it originated from the formation of the eye, or other causes, he could not tell.

The Chairman said that a friend of his laboured under this infirmity to such an extent that, whenever he wished to produce a very glowing colour, he used purple in his diagrams. With regard to moulded bricks, he had always found that it was difficult, when using them, to preserve a continuous line; for, unless the brick was cut sharp in the first instance, the effect would be unsightly.

Mr. Hewitt said that, to insure sharpness of outline, the quality of the clay must be uniform, and the brick well made and burnt. He admired a coloured building exceedingly, provided the ornamentation was judiciously introduced. A slight variety in the working would be found to produce many pleasing forms.

Mr. Hall deprecated rubbing brickwork to make a continuous line, as a change of colour was usually produced by the process, while the work was more liable to frost.

After some further discussion, a vote of thanks was accorded to Mr. Johnson for his paper, and the proceedings terminated.

It was announced that the next subject for the Class of Design would be a group of allegorical sculpture to celebrate a national event, with pedestal. At the meeting on the 3rd of February a paper will be read by Mr. T. Blashill on "The Application of Ironwork to Architecture."

PROVINCIAL NEWS.

Worcester.—The annual report of the Local Board of Health on the new drainage and water-supply works shows that the entire length of new sewers is 84,971 feet, and the total amount paid under the contract for their construction, 18,502*l.* The works of water-supply were performed under several contracts, and the entire length of water-pipes laid down is 93,645 feet. The cost of the pipes was 7,518*l.*, and in laying them down 2,810*l.* were expended. There has been paid for the erection of the engine-house, filtering-beds, reservoir, &c., 9,786*l.*; for the engines, pumps, and machinery, 2,678*l.*; hydrants, &c., 859*l.*; making a total of about 42,156*l.* This does not include sums paid for purchase of land, legal expenses, engineer-in-chief's commission, and the salaries of the resident engineer, inspectors of works, &c.

Redruth.—The new public rooms erected in the town of Redruth have been completed and formally opened. They are in the Pointed style. The chief front facing into Penryn-street is composed of a main building and two subordinate wings, the former being slightly set forward. All the groins and window and door dressings are of stone, from the Box-hill quarries, in Wilts. A brick and stone cornice is carried along the eaves and gablets, and the voussoirs of the relieving arches on the entire front are of black and red brick alternated. In the north wing is the public doorway to the assembly-room, hall, or concert-room, which is reached by a flight of granite steps. This room is 55 feet 6 inches long, 36 feet wide, and 22 feet high. The roof timbers of the room show as high as the collar beams. The spaces between the constructive timbers are panelled with boarding, the centre panels being perforated for ventilation. At the north end is a small gallery, projected from the wall on iron brackets, and having a light iron front, painted red, white, and blue, and picked out with gold. Ten windows, five on each side, afford light. The walls are stuccoed a warm tint, with St. Agnes sand, and the whole of the wood-work is stained in shades and varnished. There are rooms for the Mechanics' or Literary Institution, billiard and chess room, a news-room, the curator's apartments, a room for parochial business, &c. The cost of the building has been 2,000*l.* Mr. W. G. Habershon was the architect; Messrs. Nicholls & Son, of Redruth, and Mr. W. May, of Pool, the general contractors; Mr. J. Trestrail clerk of the works on behalf of the proprietors; and Mr. S. Knight the representative of Mr. Habershon.

Nottingham.—The new Sunday schools, recently erected in connection with Derby-road Chapel, have been opened. The building is in the Geometric style. It is constructed of Bulwell stone, with Ancaster dressings. It comes up to the Park Tunnel on one side, and advantage has been taken of the difference in the level to gain on this side a lower story, containing four class-rooms, the heating apparatus, coppers, &c. The chief entrance is from Victoria-street, and leads into the principal rooms, which are in the form of an L; that intended for the boys' school being 50 feet by 21 feet; that for the girls', 42 feet by 23 feet. They are divided by sliding-doors. A superintendent's room is contrived in the angle, communicating with the schools. This room will also be used as a library. The infants' school is so placed as to be easy of access from the boys' or girls' schools, and is fitted up with a gallery, which can be folded up so that the room may be used for committee meetings, &c. This room is about 20 feet square. A separate entrance from Victoria-street has been made for the boys, and a private entrance to the chapel. The whole of the flues are carried up in a stone chimney-shaft. Mr. Ferguson was the contractor. Messrs. Haden supplied the heating apparatus, and Mr. Wheeler the plumber and glazier's work. The total cost will be between 1,200*l.* and 1,300*l.* Mr. R. C. Sutton, of Nottingham, is the architect.

Leith.—An extensive structure has recently been completed here, at a cost of 25,000*l.* It is called the Leith Flour-mills, which have been built, the machinery and gearing prepared, the engines fitted up and set to work, within the short space of twelve months: it being but eight months since the first pillars were erected. The mill is six stories high, and the granary the same height, but considerably longer than the mill. Mr. Thomas Mc Guffie, of Glasgow, was the architect employed. The engineers and millwrights were Messrs. Emmerson & Murgatroyd, of the Heaton Foundry, Heaton Norris, Stockport. The engines and gearing are calculated to transmit a power of 300 horses indicated. The mill is fitted up, at present, with twenty-four pairs of French Burr stones, driven by belts from a centre line of uprights, twelve on each side, which uprights are driven by a line of shafting 90 feet in length, and having upon it twelve large mortise-wheeled gearing into the pinions of the uprights. Mr. R. Young, of Glasgow, has furnished the machinery for the various processes connected with the grinding, prior to the material being ready for the market. Mr. Spiden was the contractor for the masonwork; but he only survived the completion by a few days. The joiners' work was completed by Messrs. Henderson & Wilson, of Leith; and the boilers, which are fitted with Young's patent for the prevention of the smoke nuisance, were furnished by Messrs. Hawthorn, of Leith.

THE ANCIENT ARCHITECTURE OF CEYLON.*

THERE is a trace, in extreme antiquity, of a curious connective link of commercial association between the island of Ceylon in the far east, and the island of Great Britain in the far west, which Sir Emerson Tennent has assisted in bringing more clearly into light; and which, in these days,—when Britain has not only close and continual relationships, of a similar kind, with this *ultima thule* of the eastern Indies, but is, in fact, her sovereign mistress,—is peculiarly interesting. "A careful perusal of the Scripture narrative," remarks Sir Emerson, "suggests the conclusion that there were two places at least to which the Phœnicians traded, each of which bore the name of Tarshish; one to the north-west, whence they brought tin, iron, and lead; and another to the east, which supplied them with ivory and gold." Now it is obvious that this author has a British—that is, a Cornish—port in view, as the Tarshish of the north-west, it being well known that the ancient Phœnicians obtained their tin from Cornwall, and probably their lead and iron also from Britain. But what Sir E. Tennent more especially directs his attention and that of his readers to is the probability that the eastern Tarshish of the Phœnicians was the port of Galle in Ceylon, which, he remarks, "is by far the most venerable emporium of foreign trade, now existing, in the universe: it was the resort of merchant ships at the earliest dawn of commerce, and it is destined to be the centre to which will hereafter converge all the rays of navigation, intersecting the Indian Ocean and connecting the races of Europe and Asia."

We cannot follow Sir Emerson in his lucid exposition of the reasons which induce him to urge the identity of the ancient Tarshish of the east with the port of Galle in Ceylon, and Malacca with Ophir,—on the way to which the island of Tarshish lay; our purpose, in the present article, being simply to dig out a few architectural details from the very valuable, miscellaneous, and interesting quarry which he has presented to the public in his work on Ceylon. We may quote a portion, however, of what he says on the subject of the eastern Tarshish:—

"The ships intended for the voyage were built by Solomon at 'Ezion-geber on the shores of the Red Sea.' The rowers coasted along the shores of Arabia and the Persian Gulf, headed by an east wind. Tarshish, the port for which they were bound, would appear to have been situated in an island, governed by kings, and carrying on an extensive foreign trade. The voyage occupied three years in going and returning from the Red Sea, and the cargoes brought home to Ezion-geber consisted of gold and silver, ivory, apes, and peacocks. *Gold* could have been shipped at Galle from the vessels which brought it from Ophir: '*silver* spread into plates,' which is particularized by Jeremiah, as an export of Tarshish, is one of the substances on which the sacred books of the Singhalese are even now inscribed: *ivory* is found in Ceylon, and must have been both abundant and full grown there before the discovery of gunpowder led to the wanton destruction of elephants: *apes* are indigenous to the island; and *peafowl* are found there in numbers. It is very remarkable, too, that the terms by which these articles are designated in the Hebrew Scriptures are identical with the Tamil names, by which some of them are called in Ceylon to the present day: thus *tukeyim*, which is rendered 'peacocks' in one version, may be recognized in *tokei*, the modern name for these birds: *kapi*, apes, is the same in both languages; and the Sanskrit *ibha*, ivory, is identical with the Tamil *ibam*.

Thus, by geographical position, by indigenous productions, and by the fact of its having been from time immemorial the resort of merchant ships from Egypt, Arabia, and Persia, on the one side, and India, Java, and China, on the other, Galle seems to present a combination of every particular essential to determine the problem so long undecided in biblical dialectics, and thus to present data for inferring its identity with the Tarshish of the sacred historians, the great Eastern mart so long frequented by the ships of Tyre and Judea."

The two volumes of the excellent work under notice are plentifully interspersed with architectural as well as a vast variety of other interesting details; but the author has also given a general view of Ceylonese or Singhalese architecture, to which we will gladly have resource, as affording a condensed abstract, more accordant with our limits, and at the same time affording our professional and other readers some idea of the interest of the other portions of the work,—to them in particular, as well as to the general public.

"*Architecture.*—In Ceylon, as in Egypt, Assyria, and India, the ruins which survive to attest the character of ancient architecture are exclusively sacred, with the exception of occasional traces of the residences of theocratic royalty; but everything has perished which could have afforded an idea of the dwellings and domestic architecture of the people. The cause of this is to be traced in the perishable nature of the sun-dried clay, of which the walls of the latter were composed. Added to this, in Ceylon there were the pride of rank and the pretensions of the priesthood, which, whilst they led to lavish expenditure of the wealth of the kingdom upon palaces and monuments, and the employment of stone in the erection of temples and monasteries, forbade the people to construct their dwellings of any other material than sun-baked earth. This practice continued to the latest period; and nothing struck the British army of occupation with more surprise on entering the city of Kandy, after its capture in 1815, than to find the palaces and temples alone constructed of stone, whilst the streets and private houses were formed of mud and thatch.

Though stone is abundant in Ceylon, it was but sparingly used in ancient buildings. Squared stones were occasionally employed, but large slabs seldom occur, except in the foundations of dagobas. The vast quantity of material required for such structures, the cost of quarrying and carriage, and the want of mechanical aids to raise ponderous blocks into position, naturally led to the substitution of bricks for the upper portion of the superstructure.

There is evidence to show that wedges were employed in detaching the blocks in the quarry, and the amount of labour devoted to the preparation of those in which strength, irrespective of ornament, was essential, is shown in the remains of the 1,600 undressed pillars* which supported the Brazen Palace at Anarajapoora, and in the 1,800 stone steps, many of them exceeding 10 feet in length, which led from the base of the mountain to the very summit of Mihintala. A single piece of granite lies at Anarajapoora hollowed into an 'elephant trough,' with ornamental pilasters, which measures 10 feet in length by 6 wide and 2 deep; and amongst the ruins of Pollanarrua a still more remarkable slab, 25 feet in length, by 6 feet broad and 3 thick, bears an inscription of the twelfth century, which records that it was brought from a distance of more than thirty miles.

The majority of the columns at Anarajapoora are of dressed stone, octangular and of extremely graceful proportions (fig. 1).† They were used in profusion to form circular colonnades around the principal dagobas, and the vast numbers which still remain upright are one of the peculiar characteristics of the place, and justify the ex-

[1] "Ceylon: an Account of the Island, Physical, Historical, and Topographical; with Notices of its Natural History, Antiquities, and Productions." By Sir James Emerson Tennent, K.C.S., LL.D., &c.; Illustrated by Maps, Plans, and Drawings. Third Edition, thoroughly revised. London: Longman & Co. 1859

* The "Rajavali" states that these rough pillars were originally covered with copper; p. 222.

† See page 56 for illustrations.

pression of Knox, when, speaking of similar groups elsewhere, he calls them a 'world of hewn stone pillars.'

Allusions in the *Mahawanso* show that extreme care was taken in the preparation of bricks for the dagobas. Major Skinner, whose official duties as engineer to the Government have rendered him familiar with all parts of Ceylon, assures me that the bricks in every ruin he has seen, including the dagobas at Anarajapoora, Bintenne, and Pollanarrua, have been fired with so much skill that exposure through successive centuries has but slightly affected their sharpness and consistency.

The sand for mortar was 'pounded, sifted, and ground on a grinding-stone;' the 'cloud-coloured stones,'* used to form the immediate receptacle in which the sacred relic was enclosed, were said to have been imported from India; and the 'nawanita' clay, in which these were imbedded, was believed to have been brought from the mythical Anottatho lake in the Himalayas.

Dagobas.—The process of building the Ruanwellé dagoba is thus minutely described in the *Mahawanso*:—'That the structure might endure for ages, a foundation was excavated to the depth of one hundred cubits, and the round stones were trampled by enormous elephants, whose feet were protected by leather cases. Over this the monarch spread the sacred clay, and on it laid the bricks, and over them a coating of astringent cement, above this a layer of sand-stones, and on all a plate of iron. Over this was a large pholika (crystallized stone), then a plate of brass, 8 inches thick, embedded in a cement made of the gum of the wood-apple tree, diluted in the water of the small red cocoa-nut.'†

The shape of these huge mounds of masonry was originally hemispherical, being that best calculated to prevent the growth of grass or other weeds on objects so sacred. Dutugaimunu, according to the 'Mahawanso,' when about to build the Ruanwellé dagoba, consulted a mason as to the most suitable form, who, 'filling a golden dish with water, and taking some in the palm of his hand, caused a bubble in the form of a coral bead to rise on the surface; and he replied to the king, "In this form will I construct it."'‡

Two dagobas at Anarajapoora, the Abay-a-giri and Jeyta-wana-rama, still retain their original outline: the Ruanwellé, from age and decay, has partly lost it: the Thupa-ramaya is flattened on the top as if suddenly brought to a close; and the Lanka-ramaya is shaped like a bell.

Monasteries and Viharas.— . . . Simplicity and retirement were at all times the characteristics of these retreats, which rarely aspired to architectural display; and the only recorded instance of extravagance in this particular was the 'Brazen Palace' at Anarajapoora, with its 1,600 columns; an edifice which, though nominally a dwelling for the priesthood, appears to have been in reality a vast suite of halls for their assemblies and festivals, and a sanctuary for the safe custody of their jewels and treasure.§

Allusions are occasionally made to other edifices more or less fantastic in their design and structure, such as 'an apartment built on a single pillar,' a 'house of an octangular form,' built in the twelfth century, and another of an 'oval,' shape, erected by Prakrama I.

Palaces.—The royal residences, as they were first constructed, must have consisted of very few chambers, since mention is made in the 'Mahawanso' of the earliest, which contained 'many apartments,' having been built by Pandukabhaya, B.C. 437. But within two centuries afterwards, Dutugaimunu conceived the magnificent idea of the Loha Pasada, with its quadrangle 100 cubits square, and a thousand dormitories with ornamental windows. This palace was in its turn surpassed by the castle of Prakrama I. at Pollanarrua, which, according to the 'Mahawanso,' was 'seven stories high, consisting of 5,000 rooms, lined with hundreds of stone columns, and outer halls of an oval shape, with large and small gates, staircases, and glittering walls.'

In what now remains of these buildings at Anarajapoora, there is no trace to be found of an arch, truly turned and secured by its keystone; but at Pollanarrua there are several examples of the false arch, produced by the progressive projection of the layers of brick.

The finest specimens of ancient brickwork are to be seen amongst the ruins of the latter city, where the material is compact and smooth, and the edges sharp and unworn. The mortar shows the remains of the pearl oyster-shells from which it was burnt, and the chunam with which the walls were coated still clings to some of the towers, and retains its angularity and polish.‖

Of the details of external and internal decoration applied to these buildings, descriptions are given which attest a perception of taste, however distorted by the exaggerations of Oriental design. 'Gilded tiles' in their bright and sunny atmosphere, must have had a striking effect, especially when surmounting walls decorated with beaded mouldings, and festooned with 'carvings in imitation of creeping plants and flowers.'"

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* The "cloud-coloured stones" may possibly have been marble, but no traces of marble have been found in the ruins. Diodorus, in describing some of the monuments of Egypt, alludes to a "party-coloured" stone, λίθον ποικίλον which likewise remains without identification.—*Diodorus*, l. i. c. lvii.

† "Mahawanso," ch. xxix., p. 169; ch. xxx. p. 178. The internal structure of the Sanchi tope at Bilsah, in Central India, presents the arrangement here described, *the bricks being laid in mud*, but externally it is faced with dressed stone.

‡ Mahawanso, ch. xxx. p. 175. This legend as to the origin of the semicircular form of the dagoba is at variance with the conjecture of Major Forbes, that these vast structures were merely an advance on the mounds of earth similar to the barrow of Halyattes, which, in the progress of the constructive arts, came to be converted into brickwork.—"Eleven Years in Ceylon," v. i. p. 222.

§ "Mahawanso," ch. xxvii. p. 168. Like the "nine-storied" pagodas of China, the palace of "the Lowa Maya Paya" was originally *nine stories* in height, and Fergusson, from the analogy of Buddhist buildings in other countries, supposes that these diminished in succession as the building arose, till the outline of the whole assumed the form of a pyramid ("Handbook of Architecture," b. i. ch. iii. p. 44). In this he is undoubtedly correct, and a building still existing, though in ruins, at Pollanarrua, and known as the *Sat-mal-pasada*, or the "*seven-storied palace*," probably built by Prakrama, about the year 1170, serves to support his conjecture.

‖ Expressions in the "Mahawanso," ch. xxvii. p. 164, show that as early as the second century, B.C., the Singhalese were acquainted with this beautiful cement, which is susceptible of a polish almost equal to marble.

On the subject of carving, the author offers some curious and interesting remarks, especially as regards "the beautiful kala hanza" or "sacred goose," ever "eager to set out for the sacred lake," and reminding one of the Scriptural dove, ever ready to fly to "its windows," and the Egyptian Ibis, ever waiting to fly into the adytum of the temple, where its monolithic stone cage stood (as depicted on mummy coffins, with bars in front, and the bird looking out), and where it was probably fed with its favourite serpents. The "watchful" and "faithful" goose of the Romans was already sacred to Juno, and domesticated in her temple, as Sir Emerson remarks, previous to the saving of the citadel by the anserial watchers, so that this latter event does not account for even the ancient Roman respect for the goose. It was also sacred among the Egyptians, by whom, as by the Burmese, balance weights were made in the shape of the sacred goose; and even the Christian crusaders adored a goose, which they believed to be filled with the Holy Spirit, as Mill in his history of the Crusades informs us. Gas (spirit?) is the Swedish name of the goose, which latter word itself seems to have had the same etymological origin. It is remarkable, however, that a carved kala hanza in the Singhalese royal palace of Kandy much more closely resembles the dodo (a giant of the Columbidæ order, believed to be now extinct (in New Zealand), but still extant in Thibet, than any known goose.

In his chapter on the "Ruined Cities," Sir Emerson gives an account of the rock temple of Dambool. The ascent is by a steep and toilsome path across the lower mass of the rock; and the grand gateway, profusely adorned with carvings in stone, and disclosing within a sedeat figure of "The Vanquisher," of which we give a view (fig. 2), is approached on crossing a courtyard.

Fig. 3 is a representation of the *Sat-Mahal-Prasada*, whose name perpetuates the memory of the "Seven-storied House." In front of this extraordinary building lies an enormous carved slab, called the "Stone-book," from its resemblance to a Singhalese volume of olas. It is a monolith, 26 feet in length, 4 feet broad, and 2 feet thick, bearing an inscription containing the intimation that "this engraved stone is the one which the strong man of the King Nissanga brought from the mountain at Anarajapoora, a distance of more than eighty miles." The inscription is said to have been engraved about A.D. 1196.

We will conclude our extracts on the subject of Ceylonese architecture with a few farther remarks on—

"*Temples.*—The temples of Buddha were at first as unpretending as the residences of the priesthood. No mention is made of them during the infancy of Buddhism in Ceylon; at which period caves and natural grottos were the only places of devotion. In the sacred books these are spoken of as '*stone* houses,' to distinguish them from the 'houses of *earth*' and other materials used in the construction of the first buildings for the worship of Buddha; such temples having been originally confined to a single chamber of the humblest dimensions, within which it became the custom at a later period to place a statue of the divine teacher, reclining in dim seclusion, the gloom being increased to heighten the scenic effect of the ever-burning lamps by which the chambers are imperfectly lighted.

The construction of both these descriptions of temples was improved in later times, but no examples remain of the ancient chaityas or built temples in Ceylon, and those of the rock temples still existing exhibit a very slight advance beyond the rudest attempts at excavation."

Of the modern temples the author says,—

"It was in all probability owing to the growth of these [monastic] institutions, and the establishment of colleges in connection with them, that halls were eventually appropriated for the reception of statues; and that apartments so consecrated were devoted to the ceremonies and worship of Buddha. Hence, at a very early period, the dwellings of the priests were identified with the chaityas and sacred edifices, and the name of the Wihara came to designate indifferently both the temple and the monastery.

But the hall which contains the figures of Buddha, and which constitutes the 'temple' proper, is always detached from the domestic buildings, and is frequently placed on an eminence from which the view is commanding. The interior is painted in the style of Egyptian chambers, and is filled with figures and illustrations of the legends of Gotama, whose statue, with hand uplifted in the attitude of admonition [or with the two forefingers extended, as in the Papal act of benediction, as elsewhere remarked], or reclining [with closed eyes, and] in repose, emblematic of the blissful state of Nirwana, is placed in the dimmest recess of the edifice. Here lamps cast a feeble light, and the air is heavy with the perfume of flowers, which are daily renewed by fresh offerings from the worshippers at the shrines."

As to a peculiar, but heretofore known, mode of lighting the statue in Indian temples, of which the author suspects that one instance, at least, occurred in Ceylon, he says,—

"Allusion has already been made to the identity in certain particulars observable between the Buddhist temples of Ava and those of Ceylon. Amongst the buildings at Pagannoyo, on the Irawaddi, is a pagoda known as the 'Cave of Ananda,' and in it a gilded figure of Buddha, similar in attitude to that in the Jayta-wana-rama ['an immense edifice of brick, in the highest style of ornamented southern Indian architecture' in Ceylon, 'built by Prakrama Bahu I., after the model, it is said, of one erected by Buddha himself at Kapili-vastu, the place of his birth'], stands in a vaulted cell, situated at the further extremity of a darkened aisle. Into the alcove in which it is placed the only light that is admitted streams through an opening so situated as to be unseen by the spectator in front, and thence it is poured like a halo over the head of the glorified object below. (See fig. 4.)

This mode of illuminating an interior is common in the rock-cut basilicas of India, in which 'one undivided volume of light, coming through a single opening over head, falls directly on the altar or other principal object, leaving the rest of the structure in comparative obscurity.' The similarity of position and the identity of attitude between the two statues, in Ava and Ceylon, suggest the conjecture that the figure at Pollanarrua, like that at Pagan-myo, may have been placed in the recess which it occupies, so as to admit of being lighted in a similar manner from an aperture concealed in the roof; and it will be an interesting inquiry, for some future explorer, provided with the necessary facilities, to determine, by a minute examination of the walls, whether they may not have been so constructed as to cast a mysterious light on the gilded idol below."

Buddha himself, as Sir Emerson remarks, is not worshipped as a deity, but "merely reverenced as a glorified remembrance;" and certainly such a mode of exhibiting his statue, like that of the Thibetan and Indian rituals, in which lights, flashed round the head, suddenly and momentarily reveal the Buddha, or other statue, in the midst of intense darkness, is capable of suggesting just such an idea as that of a "glorified remembrance," and reminds one of the curious "Buddha rays," which the morning sun in Ceylon sheds round the head *of the shadow* of the human form projected on the ground.*

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* The following very curious extract on "The Illumined," from the "Dnyaneshvari," of India, "that most mystic of all mystic books" (as a writer in the *Dublin University Magazine* calls it), will here be of interest, as it seems to comprise an endeavour to describe the nature and appearance of a "thaumaturgic saint," in the state of "divine absorption," or, in fact, just some such "glorified" being as that represented by the statue of Buddha, whether reclining, as in the divine quiescence, or entranced repose, of "Nirvana;" or seated, with uplifted palm and fingers, as in the act of exhorting or of blessing the devotees;—whether, in short, as the "waking God" in the sleeping man, or the waking man in the "sleeping God."

In this passage the "glorious body" of "the illumined" is itself compared (with a touch, mayhap, of "Oriental hyperbole") to a statue, cast in divine thaumaturgic perfection, molten [softened?] down: to me, beholding, it appears Quietism itself, personified with limbs;—as a painting of divine bliss, — a sculptured form of the sovereign happiness. . . . Or is it the embodied presence of Light that is sitting on yonder seat? Such becomes the body, what time the annular power [in "contemplative abstraction"] drinks the moon-fluid of immortality, descending from the brain ["by a discharge from above," into "the mouth of the power" beneath]. Then, O Friend! Death dreads the shape of the body. Then disappears old age! The knots of youth are cut to pieces, and the lost state of childhood reappears!—[See *Dublin University Magazine*, April, 1854, on "The Dream of Ravan."]

The splendour of the illumined and immortalized body thus "modelled into that of a perfect man," or man-god, is described in glowing language. He casts his old skin, like the serpent, as well as his teeth and nails. "The body," it is said, "becomes of gold in lustre,"—like the statue of Buddha, which is generally gilded. It is also compared, among many other things, to "a vase filled with liquid saffron,"—reminding one of the "saffron-hued" Bacchus of the Greeks; and to "a pillar lit from within," or "of the interior light," affusive, doubtless, to "the luciform body," which, Suidas tells us out of Isidorus, "still exists, within this terrestrial body of ours, like light within a dark lanthorn,"—till it be evoked into autoptic exaltation,—as it would *here* appear, by "the annular power" beneath the great brain,—whatever may be meant by that "annular power" and its "middle chamber;"—and those at all acquainted with that most mysterious of all mysterious anatomical and physiological subjects,—the structure and functions of the brain, great and small, of the annular protuberance, and of the medulla oblongata,—need have little difficulty in perceiving that here there is at least "a method" in what others may be led to look upon as little else than mystic "madness."

This "annular power," it is said, "retires [in "contemplative abstraction"] into the middle chamber: *then*, with a discharge [as of "lightning"] from above, the reservoir of moon fluid of immortality, contained in the brain, leaning over to one side, communicates into the mouth of the power: thereby the [nerve] tubes are filled with the [immortalizing and illuminating] fluid, and it penetrates into all the members."

But enough of the physiological *modus operandi* of the regeneration and immortalization of the Oriental "twice born," or "deathless brotherhood" of "two origins;" who, whatever they may once have been, are indeed but a "glorified remembrance," which has now no real and objective existence, in this "iron age" of ours. We may here, however, add a very few words more, from the conclusion of the curious description, just quoted, of "the illumined." It is said that "He hears the language of Paradise. . . . He is called Kechara, the Sky-goer. This step being attained is a wonder among people in the [natural] body. Behold the Sadhaka—the thaumaturgic Saint," in his—

"Mysterious and illumined sleep,
The body's trance—the spirit's seeing."

Just such a "glorified" and saintly human being, "bound in the bundle of life together with" his "Irradiates" or Illuminater, does the statue of the Buddha seem to have been intended, of old, to represent, in the belief of 350,000,000 of the human race. Buddhism and Brahminism are closely akin. See articles, in *Builder* of 10th October, 1858, and 15th January, 1859, on "Symbols," by John E. Dove.

ANCIENT ARCHITECTURE OF CEYLON.*

Fig. 2. *Entrance to the Temple of Dambool.*

Fig. 1. *Column at Anarajapoora.*

Fig. 3. *The Sat-Mahal Prasada.*

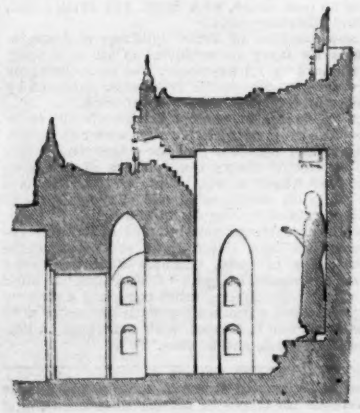


Fig. 4. *Statue and Section of a Buddhist Temple in Ava.*

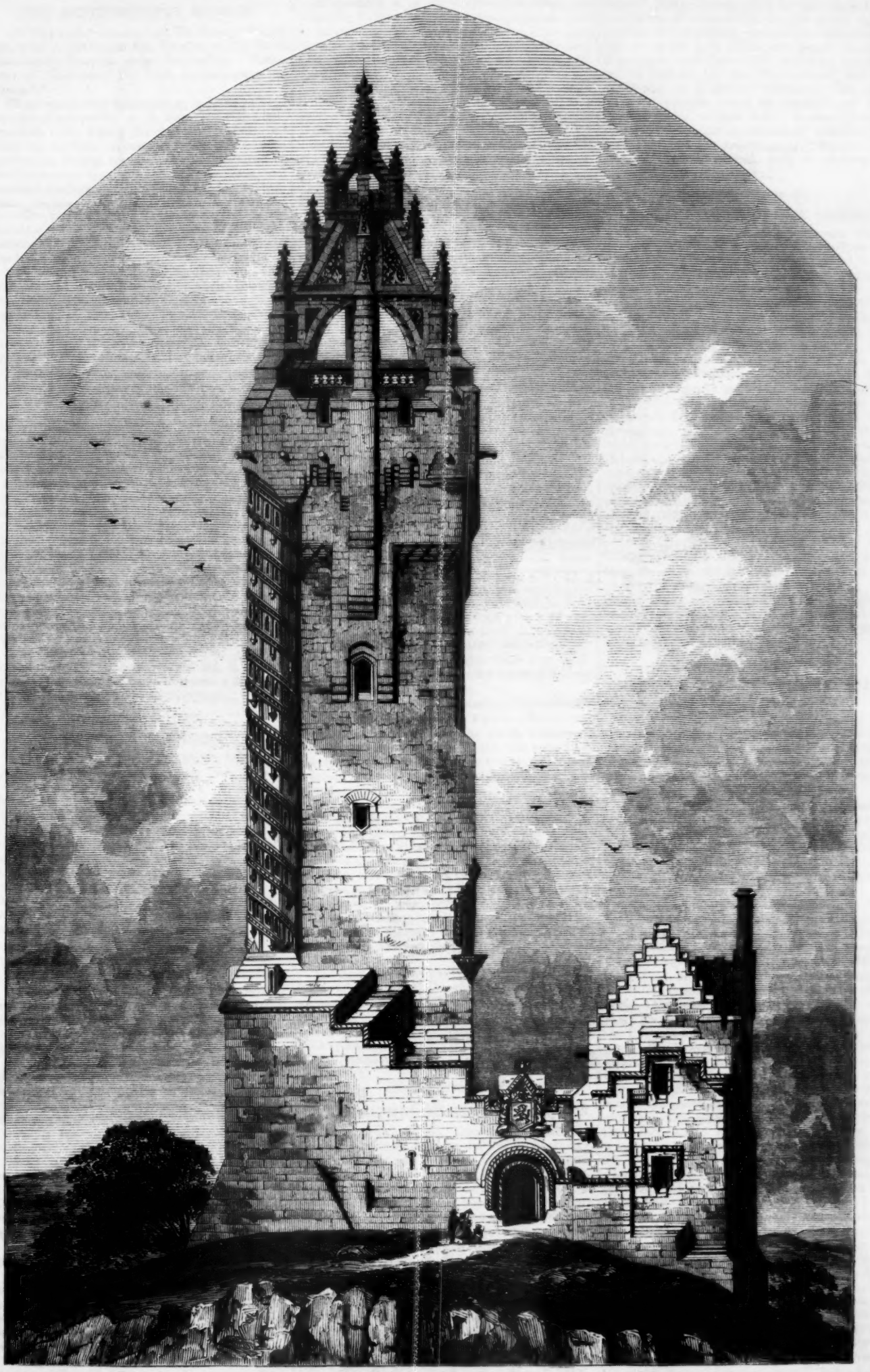
SELECTED DESIGN FOR THE NATIONAL WALLACE MONUMENT.

THE monument proposed to be built on the Abbey Craig, near Stirling, consists of a lofty and imposing Scottish baronial tower, upwards of 200 feet high, and 36 feet square, having walls 15 feet thick at the base, and graduating from 5 feet to 6 feet at the top. The masonry is to be of a strong and enduring description, concreted with thin hot lime. At the east side of the tower is the keeper's house, between which and the monument is an open courtyard, entered by a massive circular-arched gateway, having bold mouldings, characteristic of the Scottish baronial style, above which is placed the heraldic arms of Sir William Wallace. Passing through the gateway into a stone-arched passage, a straight flight of steps, set in the thickness of the wall, leads to an open octagon winding staircase, the walls of which are of solid ashlar work, projecting from the south-west angle of the tower, and running up nearly its entire height. The walls of the staircase raking with the stair are pierced with arrowlet slits, or lights, continuously in each flight of steps to the summit of the square tower. Externally the walls of the staircase are bound about with imitation rope-work, with bold moulded angles. The handrail is wrought out of the solid newel. This staircase conducts to several spacious and lofty halls, the ceilings and floors of which are fireproof, being arched with brick, having the floors laid with mosaic tiles. It is proposed to set apart these several rooms as visitors' and reliquary rooms, or museums for the reception of old armour and other antiquarian relics illustrative of early Scottish history, and, should the funds permit, an appropriate marble statue of Wallace will be placed in the uppermost gallery or hall. The apex of the monument exhibits the form of an imperial open crown of stone. The whole monument can scarcely fail to present a commanding outline and graceful feature when seen against the open sky. The coronal top or crown is upwards of 50 feet high, and consists of eight arms, from the angles and sides, all converging and abutting on the centre upon an open newel staircase, and forming a series of flying buttresses, broadly ribbed, having the spandrils richly filled in with open tracery: the outer raking flanks of the buttresses are surmounted with massive crocketed pinnacles.

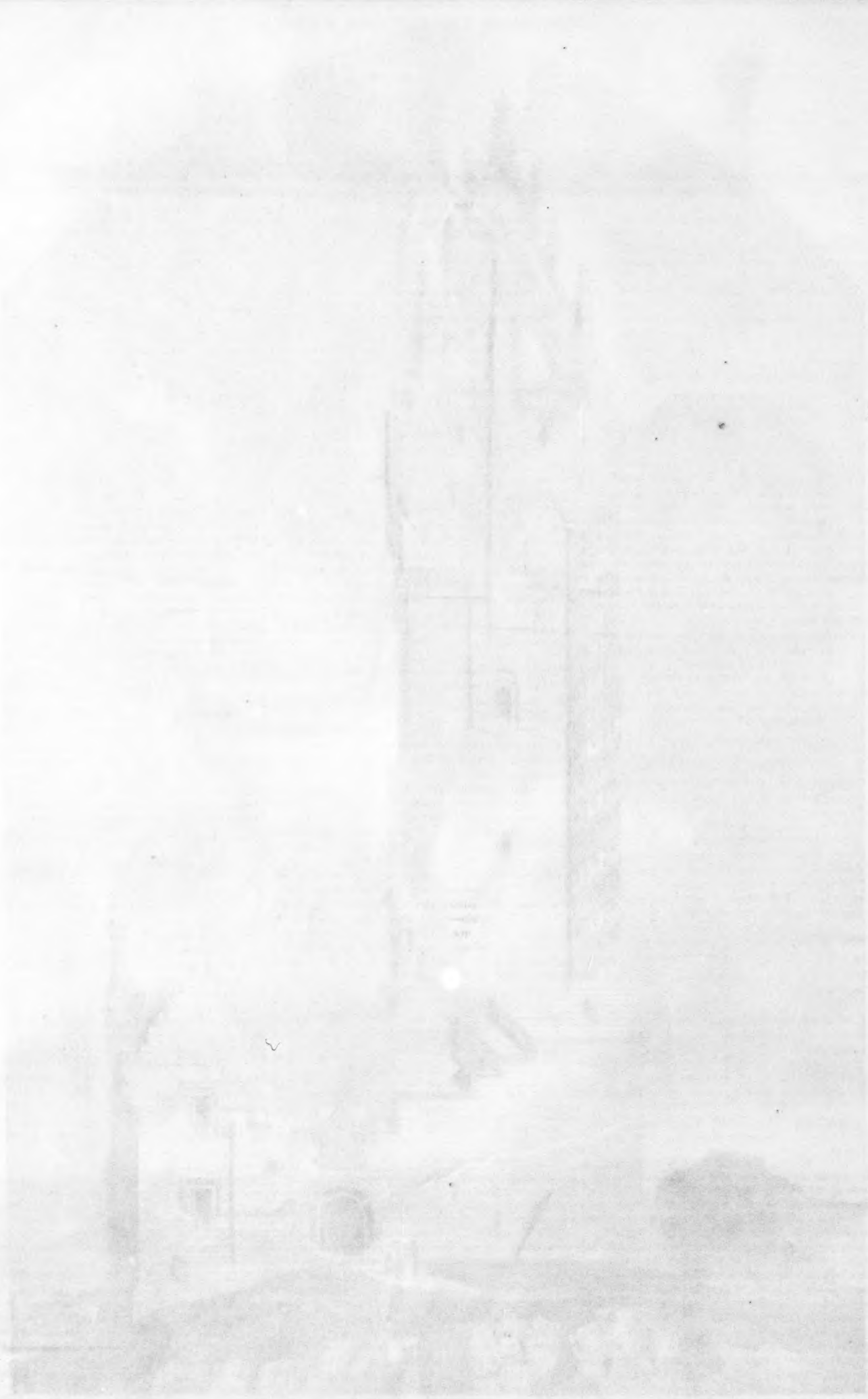
We may add that the site is one of great beauty, and from the monument will be had some magnificent views of a wide and extensive plain of country, overlooking, as it does, the scene of numerous and hard-fought battle-fields.

We understand it is determined to carry out the design. Mr. J. T. Rochead is the architect.

* See page 54.



SELECTED DESIGN FOR THE WALLACE MONUMENT, STIRLING, SCOTLAND.——MR. J. T. ROCHEAD, ARCHITECT.



THE ARCHITECTURAL MUSEUM.

ON Wednesday evening last, Mr. George Godwin delivered a lecture in the Theatre of the South Kensington Museum, under the heading "Memorials of Workmen: the Past to encourage the Present."

There was a very full meeting, including a large number of art-workmen. A. Beresford Hope, esq., presided. On taking the chair for the first time since his election as president, Mr. Hope commented in feeling terms on the loss sustained by the Museum in the death of Earl de Grey, and renewed his own "oath of fealty" to the Institution. In the course of his speech he mentioned an offer received from India to deposit in the Museum some interesting specimens of the architecture of that country, and he then introduced the lecturer.

The lecture was addressed to those who, with abilities and aspirations, doubt their power of overcoming the difficulties that surround them, and treated of those who, in spite of the most adverse circumstances, have worthily developed themselves and bettered others. Bernard Palissy, Quintin Matsys, the men of Nuremberg,—

> "Quaint old town of toil and traffic,
> Quaint old town of art and song,
> Memories haunt thy pointed gables,
> Like the rooks that round them throng;"

the weavers, Hargraves, Arkwright, and Crompton; Brindley, the engineer; Watt, and George Stephenson, were passed in review, and such deductions were drawn as seemed valuable. James Tassie, the gem engraver, Wedgwood, Flaxman, Hogarth, Turner, Sir John Soane, John Britton, Chantrey, Thomas Cubitt, and many others followed; and the lecturer concluded with suggesting that it was neither necessary nor to be expected that all should distinguish themselves or take the top place. To do one's work, whatever that may be, so that others will be the better for it, is something; and he pointed out to the workmen of his audience where they might derive advantage, and how easily happiness was to be obtained irrespective of position.

The Chairman, in flattering terms, moved a vote of thanks to the lecturer, and Mr. S. C. Hall, in seconding it, added some interesting anecdotes of John Martin and Allan Cunningham.

BURFORD'S PANORAMA.

THE new painting in the well-known building in Leicester-square is not so much "a View of Venice from the Piazza of St. Mark" as a view of the Cathedral of St. Mark and its surroundings. It does not convey an idea of Venice, but of what it does show a capital picture is made. The cathedral is to a large scale, and the doorways are so cleverly painted that in one point of view they have all the effect of a stereograph. The domes are less deceptive—wanting rotundity. At the present moment, when all must feel interested in the miserable condition of Venetia generally, the picture has an extra attractiveness.

PROGRESS OF RAILWAYS ABROAD.

THE works of the Limoges and Agen railway are progressing rapidly. The most important portions of the Limoges tunnel have already been arched, and the bridges over the Vienne and Briance rivers have been commenced.

In the spring of this year the new line from St. Gobain to Chauny will be opened for passenger traffic. Already the produce of the celebrated glass works of the former town has arrived at Chauny by goods' trains; the reception of the works, by the directors of the factory, having taken place in the first week of last November.

The Western Railway Company of France has demanded three millions for works to be executed in 1860 on the St. Malo branch line. The Government have accepted the proposition. These works will take at least three years to complete them.

On the line from Mans to Angers the works are to commence this month (January).

An order from the prefect of the Jura, issued in conformity with the law of 3rd May, 1841, institutes an *enquête* of eight days' duration for the purchase of land for the Bourg and Besançon railway—a feeder for the Paris, Lyons, and Mediterranean Railway. The *parcellaire* plans have been deposited at the *mairies* of the *Communes* of Mouchard, Pagnoz, Aiglepierre, Les Arsures, Montigny, Villette, Arbois, and Grozon, through which the line passes as far as the Creuse Roadway, in the arrondissement of Poligny.

In a month or so the works of the Paris and Granville Railway will be in active progress—that is, as soon as the judiciary formalities are gone through for the purchase of land from refractory landholders, who would not treat *à l'aimable* with the company.

An important section of the Paris and Soissons Railway is to be shortly opened: it starts from a point on the *Chemin de Fer du Nord*, in the middle of the plains of St. Denis.

A large staff of the *Compagnie du Chemin de Fer du Midi* is at present at Dax busily collecting materials for the construction of the three great structures on the line from Ramous to Dax. These works comprise the bridges over the Adour at Dax, and over the Luy at Oro, and the Habas tunnel.

Surveys are actively being made for a railway from Bayonne to Biarritz, about five miles long, to be open for traffic the next bathing season, according to the *Journal des Actionnaires*.

Biarritz, the "Osborne" of the French monarch, deserves a railway; but, in order to have the works completed within the specified time, and according to contract, &c. &c. he must really call in the assistance of Mr. Robert Houdin, humbug-in-chief.

At Stockholm the Government has determined to bring forward a railway law, followed up by a loan of twenty-five millions of rixdollars. It is rumoured that many members of the Diet wish the proposed sum increased, in order that the railway resources may be of longer duration.

The preparatory works for the construction of a railway from St. Petersburg to Viborg, in Finland, are terminated. The line is staked out, and the work has only to be commenced, everything being ready for the contractor. It is reported to be of unrivalled facility of construction, the nature of the ground being most favourable, and materials, labour, &c. very cheap.

The Spanish Government has just approved of the concession of the Ciudad-Real and Badajoz Railway granted to Don José Forus, with a subvention of ninety-seven millions reals vellon (about 970,000*l.*) in specie, or in state "obligations" for railways. The concessionist represents four banking houses, besides railway contractors and those for public works.

M. Salamanca, the well-known Spanish capitalist, has obtained the concession for the Albacete and Carthagena line. Before the works commence, the original surveys upon which the concession was based are to be checked by the engineers, and it is said that some important modifications will be introduced into the details.

The line from Seville to Jerez is announced ready for being opened for traffic this month.

It is considered that the Barcelona and Saragossa Railway will be in full working order in the course of the present year. In the first months of the year, 189 kilometres of the line—viz., from Manresa to Lérida—are to be opened. Platelayers are at work on many points of the line, and the necessary buildings, guard-houses, &c. are being run up. The Manresa station is nearly finished, and those of Tarrega and Calaf are in a forward state.

The new line from Carthagena to Alicante has been set out by the engineers. It will have stations at Murcia, Oribuela, Callosa, Catral, and Elche.

The concession of the Tarragona and Barcelona railway has been granted to Don Magin de Grau.

The Pamplona and Tafalla line is to be opened next month.

PHOTOGRAPHIC SOCIETY'S EXHIBITION.

WE have already said that the Exhibition of Photographs, now open in Pall Mall East, is a good one; but we must go a little into particulars. It consists of 586 frames, some containing several specimens, and is very varied in character. Copies of oil paintings seldom are successful, and we saw no exception to this rule in the present collection. Copies of drawings on the contrary usually are,—witness particularly those by Mr. Thurston Thompson, after Holbein and Raffaelle. Mr. Roger Fenton in landscape retains his position: 130, "The Reed Deep, River Ribble," and 140, "Valley of the Ribble," are excellent specimens: Mr. James Mudd (20, "Durham Park"), Mr. Lyndon Smith (67, "View of Knaresborough"), and Mr. F. Bedford, compete worthily with him. "Pagan Rome" (476), "Christian Rome" (473), and "Rome" (484), are three remarkably fine photographs of the Eternal City, made by Mr. Lake Price expressly for the Art-Union of London. "Arcades from Rome" (244), photographed for the Royal Commissioners, as suggestions for the works in the gardens at Kensington, is such an application of the art as we have before now urged. A frame of portraits near these (249), consisting of a well-known explorer and five female heads, was well christened, by a learned Theban in the room, "Layard puzzled which to choose;" and gains interest under its new title. Herbert Watkins, amongst others, has as usual some excellent male portraits; and the specimens of "Nature's Engraving," by Paul Pretsch, show an advance, but are not yet up to the mark.

THE SOUTHERN OUTLET SEWER.

WE have already given an account of the works proposed to be executed in connection with the southern outlet sewer contract just let to Mr. Roland Brotherhood, of Chippenham, Wiltshire, but may add a few particulars.

It consists of a brick conduit or sewer 39,400 feet in length, of a clear internal diameter of 11 feet 6 inches; 5,000 feet of this length being in a tunnel under Woolwich: there are thirty-seven ventilating shafts, twenty-two side entrances, seven bell-mouth junctions, and sixty gullies. Its course we have already mentioned.

The work is to be completed in two years. The brickwork is intended to be of 18-inch work throughout, with the exception of the tunnel, which is to be 22½ inches; all in Portland cement. Provision is made in the specification for the defraying of extra works that will arise in the course of constructing such a large work, of various items, the most important being a sum of 45,000*l.*, 100 rods of brickwork in cement, and the same quantity in mortar.

It is calculated that in this contract alone 36,000,000 bricks will be required, and where they are to be obtained from appeared to be a question amongst contractors tendering. Mr. Bazalgette, as our readers know, is the engineer-in-chief, and Mr. John Grant is the resident engineer, on this particular work, and others on the south side of the Thames.

VAGUE SPECIFICATIONS AND WIDE ESTIMATES.

YOU occasionally astonish your readers by a comparison of the highest and lowest tenders for particular contracts. A notable instance occurred only last week, when a firm of high standing required 413,000*l.* for work that another equally respectable party undertook at 282,000*l.*

A recent number of your paper contained an interesting report of a lecture on the duties of architects, and informed us that a conscientious man would even specify the weight of the hinges for every door in a house, and the number of screws. This may be the theory: now for the practice.

Some months ago, the guardians of a large union in the country, wishing to enlarge the house, advertised for designs, and selected from a number one as most deserving the premium. Tenders were advertised for, under different trades, and a great many contractors took out quantities and tendered. The sum total of the lowest being very considerably (say 50 per cent.) above the architect's estimate, that gentleman, to use a Persian phrase, ate dirt, and retired from view. The contractors, being common fellows, were not even thanked for the trouble they had taken, but were allowed to gather the state of the case from the newspapers. Some time afterwards, the guardians again appeared, under new guidance, and contractors were again informed that they might estimate for a totally new arrangement; of course involving a repetition of the labour of taking out quantities. Being desirous of seeing the play out, I inspected the specification (?) of the engineer's work, and took notes of all the material points in it, which I send for the benefit of your readers. You will observe I have dropped the formality of office language, but in other respects the summary is a fair condensation of the original, and gives actual dimensions and quantities wherever they could be found to copy. Now, sir, I appeal to you whether you would be surprised, with no better materials than this to work upon, if one tender should be double or even three times the amount of another. Being myself a contractor, I cannot afford to offend the architect by calling the attention of his employers to the shortcomings of their adviser; and, were I foolish enough to do so, should probably be abused by all parties. However, the fact is patent. The specification is a public document,

and possibly this notice of it may induce people who talk of the recklessness of estimating to think that there is often something to be said on both sides of a story. A CONTRACTOR.

N.B.—I hesitated for some time between the *Builder* and *Punch*, but decided to appeal to you first.

Workhouse.—Supply two boilers complete, of a good size, for cooking and washing, heating dining-hall, and pumping water from a well the depth of which is unknown.

Steam-engine.—Provide a good sort of engine, as big as we are likely to want.

Heating.—Supply as much pipe as you like, to make the place comfortable.

Pump.—Supply a good kind of pump for a well of unknown depth: the size is not particular; but it must have "all necessary barrels," so that it may be worked either wholly by the engine, or wholly by manual labour, or by a little of both; and mind particularly that it must be so arranged and contrived that you can take it all to pieces, excepting the barrel actually at work, and put it together again without stopping anything. The pumps will be fixed on the surface, with *about* 140 feet of suction pipe down the well; but this is not particular, and will very likely be more; therefore, suppose we say at per foot.

Cooking.—Refix and remove the old cooking vessels, and supply new ones just the very same as the old ones.

Range.—Supply Flavel's, or any other kind you have in stock. The size is immaterial.

Pipes and Cocks.—Supply everything under this head that we have omitted to specify.

Washhouse.—Remove and refix old boilers, and supply two new ones exactly like the old ones.

Supply any wrought-iron tanks you think will be useful.

Drying Closets.—We intend to have two: the contractor is to fit them up and heat them.

Fumigating Closets.—The contractor to fit them up on any plan that he thinks a good one.

Tanks.—Supply two 700-gallon tanks, six 300-gallon, one 500-gallon; all of *boiler* plates, *bolted* together. Refix the present cistern, and supply any main-pipe and cocks that you think we shall require: we leave the sizes and arrangement entirely with the contractor, and hope he will do it nicely.

N.B.—On consideration he had better state how many elbows and toes there will be in the whole job, and about how much a piece, to enable the guardians to form a comparison between the different tenders.

Carpenters and masons' work, or work of any kind that we have omitted to describe, must, nevertheless, be provided all the same. It will naturally occur to contractors that all the boilers may require to be set in brickwork: the engine will want a foundation, and the tanks will require girders of some unknown length: many other things will arise during the progress of the job, and therefore *something* had better be put down for contingencies.

Finally, the *contractor* (!) is to keep everything in repair for twelve months, and to give a very full, clear, precise, definite, and detailed specification of everything that is necessary for the completion of the whole of the work, accompanying his tender with all the necessary drawings, so as to show most completely how everything ought to be done. This is sometimes done by the architect: but, being very troublesome, he hopes contractors will not mind it; and the fund of information the architect will obtain may also be of service to him at some future day.

Give a separate price for every item in the whole job.

Ventilation.—Provide some gratings,—probably a good many.

Weigh-Engine.—Provide a weigh-engine, and fix, complete, with masonry. Any size will do; but it had better weigh about three or four tons.

SHEERNESS DRAINAGE AND WATER SUPPLY.

THE Local Board of Health have resolved to carry out plans of drainage and water supply, by Mr. Burns, of Ely, who has been appointed engineer to the board. His success at Ely appears to have induced the Sheerness guardians to urge his merits upon the inhabitants and their sanitary representatives. A tidal plan of drainage, which had been on the *tapis*, has been abandoned on consideration of Mr. Burns's plans, although the board had theretofore been tenacious in their approval of that plan. The board, before formally adopting Mr. Burns's plan of water supply, have to rescind, as, it is said, they have determined to do, their orders in which Messrs. Birkenshaw & Conybeare's plans were accepted.

The local *Guardian* is of opinion that the hideous picture of the sanitary state of Sheerness, drawn by Mr. Austin in his report to the Privy Council, on application by certain of the residents, was perfectly correct and justifiable, and that it constituted "a righteous retribution on the board for past neglect,—especially on the members who sat previously to 1858."

A report by Mr. Burns on the sanitary condition of the town, and on its drainage and water supply, has been printed (*Guardian* office, Sheerness), in which he opens with a strong exordium against the past and present state of things, which must, indeed, be bad in the extreme, as it is stated, in this report, that, during his investigations, Mr. Burns had several times been made sick, and even to vomit, with the nefarious stench in the streets, and had been twice seized by diarrhœa from breathing the noxious vapours from stagnant cesspools.

In pressing on the board, in this report, the urgency of the case, he says:—

"The Lord instituted certain sanitary laws, for the purpose of maintaining the Israelites in good health, and He threatened them with the most severe judgments if they neglected the sanitary condition of their camp. (Deut. xxiii. 12, 13, 14.) The Lord commands, 'Thou shalt have a place without the camp, and thou shalt cover that which cometh from thee, that He see no unclean thing in thee and turn away from thee.' This command makes no exception in favour of pounds, shillings, and pence. The expenses are never contemplated. The command is, 'Thou shalt not defile the camp.' Whatever it may cost to keep it clean, it must be done, or they must abide by the awful consequences. That command, to keep the camp clean, is, I conceive, as binding upon us of the present day as it was upon the Israelites of old.

I consider it a greater crime to poison the atmosphere which we breathe than to poison a public well; because, when the water of a public well is poisoned, the well can be shut up as soon as it is detected, and the public can go to another source for their supply; but, when the air is hourly poisoned by emanations from cesspools and privies, the people who live in the vicinity of these cesspools and privies cannot avoid breathing the poison, and thus destroying their health and lives; therefore Boards of Health, Town Councils, and Guardians of the Poor, and all others who are in authority, and who allow the atmosphere to be contaminated with filth of any description, are guilty of culpable neglect of duty."

The estimate of the cost of sewerage on the plan resolved upon includes 4,450*l.* as the total amount for sewers, and 2,200*l.* for a pumping establishment; total, 6,650*l.*: annual working expenses, 202*l.* By an alternative plan the total cost would be 5,220*l.*, and the working expenses, 295*l.*

The cost of the waterworks, complete, "including well, tank to contain 633,345 gallons, two engines and pumps (duplicates), each capable of working up to 60-horse power when required, a set of twenty-four public baths, board-room, manager's and enginemen's houses, and about eight miles of public pipes with 150 hydrants, all completed in the best style of workmanship, and with the best materials (exclusive of the cost of site)," will be 11,700*l.*, and the annual working expenses, 450*l.*, which will be about 0¾d. per thousand gallons.

CARELESSNESS OF GOOD.

PERHAPS you may think the following paragraph, which I extract from Louis Figuier's scientific *feuilleton* in *La Presse*, not unworthy of a place in your miscellanea. F. D.

"We live in the midst of the ease and comfort of civilization, nearly as fishes live in water, that is to say, without taking any notice of the medium which surrounds us, and without explaining what kind of influence it exercises upon us. Science presses us on all sides; but its yoke is so light and gentle that we scarcely feel it. We travel by steam, we correspond by electricity, we are indebted to coals for light and warmth; in order to shelter and clothe ourselves, we levy contributions upon minerals, metals, and the numberless materials furnished by vegetable life; and, nevertheless, most men are still ignorant of the true nature of the air which they breathe, of the water which they drink, of the food which they eat, of the different elements which serve to sustain their lives, to satisfy their desires, interests, or fancies."

JOB AND TASK WORK IN WOOLWICH DOCKYARD.

A PRELIMINARY meeting of the operative shipwrights employed in Woolwich Dockyard was held on the 16th, for the purpose of conferring on the grievances under which they labour, with especial reference to those arising out of the system of "Job and Task Work."

It is asserted that great injustice has been done by the mode adopted in the payment of the shipwrights, which is now, and has been for some time past, regulated on the "job and task work" principle. Under this system the work is measured, and the price to be paid for it fixed by a measurer; and there being no recognized scale of charges, the workman has no idea as to what amount of wages his work will produce. It not unfrequently happens, therefore, according to the speakers, that he receives at one time, for the performance of a certain task, about half the amount of wages which, at another time, he obtains for the same work. The remuneration of the workman, in fact, constantly varies according as his work is estimated by different measurers, and one gang may receive the full or more than the full amount of wage for the labour performed, while another—working perhaps on the same ship, and doing similar work and the same in quantity—are positively paid a much smaller sum.

By the statements of several of the men who spoke, it was shown that the rate of wages at present paid at Woolwich Dockyard is barely sufficient for the support of a man with a wife and family.

"The system," the chairman observed, "seems to possess a most elastic property, as proved by the fact that, in the month of April last, he had carned 8*l.* 8s. for four weeks' labour, while, working at the same work, and the same number of hours a day, and performing the same amount of labour, his earnings for the four weeks of December only amounted to 5*l.* 5s. 6d."

Several resolutions were passed unanimously, empowering the committee to make the position of the men known.

STATE ARSENAL, NEW YORK.

THE new State Arsenal, on the Seventh Avenue, at the corner of West 35th Street, in this city, is one of the largest military edifices in the State of New York. It is built of brick and stone, three stories high, the corners on the streets being finished with towers, which are made useful as well as ornamental. The building is about 190 feet long, and 82 feet wide, within the walls. The ground story is designed to be used for ordnance and cavalry equipments; the second story for a depository of small arms and infantry accoutrements; and the third story for a spacious drill-room.

The trusses originally adopted for supporting the roof proved insufficient in strength, and the roof fell, bringing with it the upper portion of the walls, and crushing down the floors. It has, therefore, been rebuilt, and a different form of truss adopted. The American *Architects' Journal* gives an illustration of it. The span is considerable, and the peculiar uses of the upper story, as a drill-room, required that the roof should be self-supporting. The following are the scantlings of timber:—

	Feet.		Feet.		
Tie beam	12 by 10	length	86		
In two lengths, each		"	48		
Collar beam	12 " 8	"	27	6	ins.
Queen-posts	14 by 12 " 8	"	16		Oak.
Principal rafters	10 " 8	"	48		
Auxiliary rafters	10 " 8	"	29		
Braces	8 " 8	"	13		
Small braces	8 " 8	"	7	8	
Foot to upper braces	8 " 8	"	3	6	Oak.
Corbels	12 " 10	"	7	6	
Wall plate	12 " 6				
Purlins	10 " 6				
Hips	14 " 4	"	48		
Common rafters	6 " 3	"	48	6	

Each truss has five tie-bolts from the principal rafter to the tie-beam of iron, 1 inch 6-8ths in diameter. In the middle of the span, the tie from collar to tie-beam consists of two tie-bolts each of 7-8ths inch diameter. The scarph in the tie-beam is 10 feet long, in three steps: it has three cogs, and is strongly secured by ten screw bolts of 7-8ths iron passing through broad iron plates 11 feet long on the top and bottom of the beam. The corbels are fastened to the tie-beam by two screw bolts; and a stout iron strap confines the toes of the principal and auxiliary rafters to the ends of the beam and the corbels.

ARCHITECTS' CHARGE BY COMMISSION.

COMMENTING on some observations made recently at the Institute of Architects, Mr. John Bull Gardiner, who, though he has withdrawn from active duties, keeps an eye on the profession, writes as follows:—

"Elmes, with my assistance as to the introductory matter—which he was perfectly welcome to ask for—printed in his 'Annals of the Fine Arts' a true and faithful account of the often-quoted cause 'Chapman *v.* De Tastet.' Now, whoever may read such introductory matter would see readily that in sober truth and reality the cause might have been handed down as 'Gardiner *v.* De Tastet:'—my late respectable and well-known uncle Chapman had really nothing practically to do with this individual matter.

In this our so noted cause, the verdict was for 5 per cent. on the amount, with a small exception amongst the artificers' bills. Almost all the various works were done by separate tradesmen in their respective departments. The carpenter brought his action against De Tastet; so did the plasterer:—each of them obtained a verdict in the Sheriff's Court (judgment having in each case gone against the defendant by default), and both obtained their money. After this, De Tastet paid all the others; and this being accomplished, we then brought our action, and obtained, before the late Lord Ellenborough, a verdict of 5 per cent. on, save as aforesaid a small exception, the collected amount of what had been, on our fiat, so paid to the artificers. We had to

put every one of them (at last three at a time) into the witness-box; and we had respectable witnesses, since dead, of our profession, to speak to usage and custom. The defendant dared not bring a single witness to confront ours.

Who were our counsel I really now forget, but De Tastet's lawyer (the late notorious Jemmy Lowe, of Southampton-buildings) had Scarlett (before, of course, he became Lord Abinger), and his son-in-law, Campbell (before also, of course, he many years afterwards became Lord Campbell).

The said exceptional item was this:—It appeared to me judicious to introduce in one of the country-houses or offices a descending stove, —an article not then universal,—one of Moser & Co.'s patent affairs. I, of course, had not only to make attendances at Frith-street, but also to confer with Moser's people at my office and at the works, in reference to this matter. Their bill for it amounted to 40*l.*

The verdict passed at 2*l.* less than the sum which, founded on a 5*l.* per cent. commission, had been sued for.

A Fishing Bill in Chancery was immediately put forward, under the auspices of the said Jemmy Lowe, as in bar against the verdict sum; and it put me every now and then into fidgets, *i.e.*, at the several stages of it, during thirteen years. The amount was then settled. We received it, minus 80*l.*, through our respectable and truly conscientious solicitor; and De Tastet had paid, beyond the verdict sum, not less, certainly, than 400*l.* to his said confidential adviser."

THE DUBLIN WATERWORKS.

THIS discussion appears to have arrived at a climax for decision. For the necessity that exists of an additional supply of pure and wholesome water in the city of Dublin we might refer to many proofs. However, until comparatively recently (viz., February, 1859), the project, which has now assumed a tangible shape, was not brought forward, and even at that time was condemned by its present promoters; not on account of its infeasibility, but from economical views; it being expected that as pure and abundant a supply, at much less expense, was obtainable conjointly from the canals, viz., the Grand and Royal. The particulars of this scheme are briefly as follows: to place a weir across the river Liffey, at Coyford, in Blessington, County of Wicklow, and thence, through a reservoir in the vicinity, to conduct the water by a necessary aqueduct, conduit, or pipe, laid along the shortest practicable route to another reservoir at Templeogue, in the parish of Tallaght, county of Dublin (south side), and thence to the several parishes of the city by service mains. The sub-committee, to whom the corporation have confided the carrying out of this scheme, consists of three members,—Dr. Gray, J.P.T.C.; Mr. Francis Codd, J.P.T.C.; and Alderman Kinahan, J.P., each of whom has devoted much time and labour to the task.

THE STRIKE.

ACCORDING to the statement made at the weekly meeting of delegates held on Tuesday evening last, 2,300 skilled workmen are still out of work, and last week, the twenty-sixth of this unhappy struggle, they received a dividend of 4s. each. Who shall tell of the privations and distress that have been endured?

On the 11th instant a crowded meeting of the trades was held in St. Martin's Hall, Long-acre, to protest against the enforcement of the document. Mr. Ayrton, M.P., took the chair, and made a long address, after which, resolutions moved and seconded by Messrs. Potter, Macintosh, Dunning, and Arnot were unanimously adopted.

The "Conference" have issued a new appeal to the working classes, signed by their secretary, calling for further support to enable the men on strike to continue their resistance to the "document."

THE METROPOLITAN RAILWAY.

THIS railway appears at last to be fairly started; and the works, we are told, are to be forthwith vigorously proceeded with. The western portion, from Paddington to Euston-square, are contracted for by Messrs. Smith & Knight; and the eastern portion, from Euston-square to Victoria-street, City, by Mr. John Jay. The route will be from the Great Western Railway Station at Paddington along South Wharf-road, Praed-street, Marylebone-road, Euston-road, Bagnigge Wells-road, to Victoria-street, near the foot of Holborn-hill. There will be a branch in connection with the Great Northern Railway at King's-cross. The railway, nearly throughout, will be in a tunnel, the crown of which will be just under the surface of the present roads. Besides terminus stations at Praed-street and Victoria-street, there will be numerous intermediate stations along the route for the accommodation of passengers. The first essential work to be done of course is to provide for the necessary drainage of the railway and of the sewers intersected by it. For this purpose Messrs. Smith & Knight, the contractors before mentioned, have begun a new main sewer in Conduit-street, Paddington, which will be continued across Westbourne-terrace, and along Praed-street and South Wharf Road, to the Edgeware-road, at a depth of 30 feet below the surface. We understand that the workmen in Conduit-street have already laid bare an interesting relic of the past,—no less than the foundation of the famous old conduit that formerly supplied a portion of the City with the sparkling spring-water which abounded in the extensive bed of gravel and sand about Paddington.

WHO LOOKS TO THE METROPOLITAN SEWERS WORK?

I THINK the little (and very long) job in Park-road, St. John's-wood, deserves a remark.

Much has been said about the difficulty of enlarging the sewer over the bridge; but why not have divided it into two by iron pipes, there being only about 7 feet from the crown of the arch to the surface of the road, instead of the startling piece of brickwork it is now being finished with? this consisting of two-arched courses of 4-inch work in Portland cement and sand, within about *twelve inches* of the surface of the road, filled over with loose granite rubbish, and with nothing in the way of an abutment.

A short time since a railway waggon sank down about 2 feet in North Bank, several weeks after the road had been "made good" by the parish, and two teams were required to draw it out. Something worse will probably happen in Park-road, and the fault will, of course, be laid on "the weather."

Q.

The Sewer in the Fulham-road.—Several correspondents complain, and with justice, of the time during which their houses have been blockaded by the works now being executed by Walker & Neave in enlarging, by tunnelling, the existing sewer. The road opposite one house that we have in our eye has been enclosed more than a month, being used for some weeks as a material store. It is time some one walked down from Greek-street, and looked into the matter. The nuisance is insufferable.

NEW CHURCHES AND SCHOOLS IN AMERICA.

THE Church of St. Joseph, Albany, New York, is nearly completed, and is said to be a good specimen of ecclesiastical architecture. Interiorly it has marble columns, a "sparkling roof," oaken wainscoting, stained glass windows, and the spaces between each are filled in with bas-reliefs representing "The Stations," and executed in Munich.

An Irish church has been built at Lafayette, Illinois, and is one of the largest in the city. In the same town the old county seminary property has been purchased for 4,900 dollars for church and school purposes. A female school, under the direction of the Sisters of Providence, will be built, together with a church, 160 feet by 65 feet, early in spring.

The new church at Weymouth, diocese of Boston, has been dedicated and opened for Divine service. It is 86 feet by 45 feet, and contains sittings for 500 persons. There are a chapel, vestry, and two upper rooms behind the altar, besides a gallery for singers over the western entrance. It was built by Mr. Butler, of South Boston.

A new German church has been dedicated at Poughkeepsie, New York diocese; also another (St. Patrick's) at Rouse's Point, diocese of Albany.

The Roman Catholics of Camden have built a commodious edifice at the corner of Fifth-street and Taylor's Avenue.

"METROPOLITAN BUILDING COMPANY."—A general meeting of working men has been convened for this Thursday, 26th, at the Eclectic Hall, 17, Denmark-street, near St. Giles's Church, to establish a company to undertake building works and contracts. Mr. J. C. Arnaud is secretary, *pro tem.*

STAINED GLASS.

Lincoln Cathedral.—In October last, the Rev. Augustus Sutton, and Mr. H. F. Sutton, commenced to place stained glass in the large window over the west entrance of this cathedral. The lower part of the window, which is in the Perpendicular style, is divided into five compartments, and the head of the window into eight: all the quatrefoils and cusps of the latter were filled in at that time. The upper centre compartment of the lower part of the window was filled in with the figure of King David, under a Gothic canopy, with a crown on his head, a sceptre in his right hand, and the orb and cross in his left; and as the Messrs. Sutton had not at that time prepared any further figures, the window remained in an incomplete state. Since that day, however, these gentlemen have been engaged in filling up the remaining portion of the centre compartments of the window with four figures of kings of Judah, representing Jehoshaphat and Josiah on the north side of David, and Hezekiah and Asa on the south side. The lower centre compartment has been filled in with a demi-figure representing Melchisedek, and four other figures of prophets will be placed in the remainder of the compartments before Easter. The reason demi-figures are being placed in the lower compartments is because the screen, which was put up some years ago to save the towers, blocks up the lower part of the window. This is the eighth window placed in the cathedral by Messrs. Sutton.

St. Blazey Church, Cornwall.—A stained-glass window has been placed in the north aisle of the parish church of St. Blazey, in memory of Major-general Edward Carlyon, and also of Anna Maria, his wife. The window is of three lights, with tracery above. The figures chosen are Faith, Hope, and Charity. These are placed under canopies; and at the foot of each figure is an angel bearing scrolls, with a Scripture text. The head of the window consists of two angels under canopies, each holding a Scripture text. The upper spandril is a device of Faith, Hope, and Love, represented with the anchor, cross, and heart entwined. The smaller spandrils are filled with ornament. At the base of the window is the inscription. The window is of the Perpendicular style of architecture, and has been executed by Mr. Charles Gibbs, of Marylebone-road, London.

CHURCH-BUILDING NEWS.

Winchester.—The restoration of the west front of the cathedral is progressing. The terminations of the north and south aisles are already completed, the former by Mr. S. Newman, and the latter by Mr. H. J. Gillingham. Mr. Newman is now engaged upon the central portion of the façade, which is accessible by a lofty system of scaffolding and stages. The work, which is carried on under the supervision of the architect, Mr. J. Colson, will occupy some months in its execution. ——A new font is about to be placed in the church of St. Lawrence, in this city, through the liberality of the rector. The font, which is formed of Caen stone, is octagonal in shape, and partakes of the Perpendicular style in its mouldings and decorations. The sculptor was Mr. S. Newman.

Charlton (Devon).—A sepulchral cross, from the statuary yard of Mr. Thomas Lidsting, of Dartmouth, has been set up in Charlton churchyard, near Kingsbridge. It is made of Forest of Dean stone, and stands altogether fully 6 feet high. It is a pity there is not more regard paid to the designs for things of this kind, and for memorials in stone generally. The fault lies with the statuaries themselves.

Worcester.—The Watermen's Church, intended, says the local *Herald*, as a memorial of the late Rev. John Davies, now approaches completion. The building is constructed of wood, with an outer casing of corrugated iron. The structure is in form an oblong room, with a recess at the east end for a chancel. The roof is pointed, having iron rods for girders and ties. Interiorly the walls are covered with canvas, strained tightly, to hide the shrinking of the boards, and the roof is protected with felt between the wood and iron. There is an entrance at each end of the south side, and a little vestry has been provided north of the chancel. In the side walls are two-light pointed windows, at the west end two long and two short lancets, and three lancets in the east window,—all the windows being edged with blue and red glass alternately. Local critics, with some reason, condemn such a "memorial" church.

Pershore.—Considerable alterations and improvements have lately been made at Wick Church, and an increase of accommodation, espe-

cially for the poorer classes, has been thereby afforded. The church, which is of the Early English style, is situated near to Pershore, and in a numerously populated district. The additions which have been made consist of a new aisle and gallery, and partial repewing of the whole edifice, according to the design of Mr. Whitfield Daukes, the architect engaged in carrying out the improvements at Lord Ward's, whose services at Wick, it is stated, have been rendered almost gratuitously. The builders who have been employed are all tradesmen of Pershore, viz., Messrs. C. Coombe, John Nicholas, and J. Osborne and Son. There are four windows, with stone mullions, in the new aisle, one at the east end, another at the west, and two at the north side. There is likewise a porch at the entrance.

Manchester. — St. Peter's Church, Oldham-road, Manchester, has been consecrated. It is a district church, says the local *Advertiser*, and situated in Blossom-street. The church is from designs by Messrs. Holden & Son, architects, Manchester, and is built of brick, the style of architecture being Lombardic. Its distinguishing characteristic is the absence of anything like decorative stonework, the harmony of its parts being dependant entirely on the distribution of red and white bricks used in its construction. The building comprises nave, side aisles, gallery (extending along the aisles and across the west end), a semi-circular apse at the east end, and a lofty tower at the north-west angle. The extreme external length is 120 feet, and the breadth 66 feet. The tower is in three stages, the upper portion being formed of a truncated spire, covered with green and red slates. The height of the tower is 125 feet. The interior, which will seat 1,350 persons (500 free), is divided by two rows of ornamental cast-iron columns, supporting the clerestory arches, which are formed, like the other arches, of white brick. The roof of the nave, which is panelled, is divided into bays by semi-circular wood ribs. The ornamental ends of the benches are of cast iron. The organ is placed in the gallery, at the west end, over which there is a wheel window. The total cost of the structure, including the furniture, heating apparatus, lighting, and bells, is about 4,200*l.*, or 3*l.* 3*s.* per sitting. The general contractors were Messrs. Clark & Jones; and the contractors for the brickwork, Messrs. Rutherford & Lamb.

Jarrow.—It is proposed to enlarge and restore Jarrow church, according to the *Shields Gazette*. As it at present stands it is of very different ages. The nave is considered an unsuitable addition, from its style or rather want of style, apparently built in the beginning of this century. This it is proposed entirely to remove, and instead to build a nave with a narrow south aisle, and a broad gabled aisle on the north. The tower was at one time claimed as Saxon, but is not now considered earlier than Norman times. At various dates new windows have been inserted in the chancel, and in Perpendicular times a flat lead roof has been substituted for the high pitched one, whose mark still remains on the tower. These old parts of the tower, and the chancel, it is not intended to alter, except what slight repairs are necessary for their stability. Mr. Scott, the architect, has been applied to, and has furnished plans for the alterations. By his recommendation the tower and chancel should remain in their present state; while, for the present nave, he proposes to substitute another with a narrow side aisle on the south,—the old monastery buildings not permitting more; and a broad gabled aisle on the north. For the new nave he has chosen the earliest style of Pointed Gothic, while it is yet in its transition from the round-arched Norman, and while it retains many features in harmony with the Norman tower, its pointed arches giving it a relationship with the latter Gothic insertions in the chancel. The new nave is solid and quiet, but full of character. This work has been delayed for years, solely on account of want of funds. The congregation are mostly poor. The restoration of the church of the Venerable Bede, however, should be of more than parochial interest.

COMPETITIONS.

Kersall Moor, Manchester. — In a limited competition for schools connected with St. Paul's Church, Kersall Moor, near Manchester, the plans of Mr. William Walker were selected by the committee, and the architect is commissioned to carry out the works immediately.

Croydon.—The New Cemetery Buildings.—Last week, at the meeting of the local board, several architects were proposed to prepare plans or designs of the projected chapels, lodge, &c., to be built on the new burial-ground lately purchased of the trustees of the Bensham Estate, at Broad-green. In accordance with a resolution passed at the last board, the number of candidates to be nominated was restricted to twelve: the following were therefore proposed:—Mr. Woodcock, proposed by Mr. Bean; Mr. Gough, by Mr. Rigby; Mr. Carter, by Mr. Swinburne; Mr. Nullens, by Mr. Crowley; Mr. Davidson, by Mr. Drummond (the chairman); Mr. Cross, by Mr. Sutherland; Messrs. Morphew & Green, by Mr. Farley; Mr. Robins, by Mr. Castledine; Mr. Berney, by Mr. Close; and Mr. Scott, by Mr. Crafton. The board agreed that each candidate should adopt some motto to his own design, and the successful competitor should receive twenty guineas, and a commission of 5 per cent. upon the outlay, which was to be limited to 1,000*l.*; the second best to receive a premium of twenty guineas, and the third ten guineas. Other gentlemen, including several of those proposed above, were then nominated to furnish plans for the laying out of the cemetery; and the designer whose plan should be chosen was to be remunerated by a premium of twenty guineas, with a commission of 5 per cent. on the outlay; while the second was to be paid ten guineas.

Kinlock Monument.—At a recent meeting of the subscribers held for the purpose of selecting a design for the above monument, according to *Dundee Warder*, Mr. Thomas Wighton moved, "That a selection be only made on the express condition that the plans selected can be executed by a competent tradesman for a sum not exceeding 400*l.*, and that offers to that effect, and with such security as the committee may think proper, be in possession of the committee before the selection be considered final." The motion was seconded by Mr. M'Donald. There were twenty-five designs and two models shown, fourteen of which were not voted for; and, on the motion of Mr. T. Wighton, No. 24 was put aside, in consequence of its being too costly. Nos. 10, 12, 15, 23, and 31, a model, were voted for again, they having obtained the highest number of votes. Out of these, No. 12 was unanimously selected by the meeting. The designer's letter was opened and read, from which it appeared that Mr. James M'Laren, architect, Dundee, was the successful competitor.

Bishop Stortford High School.—The trustees have selected the design submitted by Mr. Murray for their new buildings.

The Hartley Institute at Southampton.—Professor Donaldson has been appointed, by the corporation of the borough, to select a design for the building of the Hartley Institute from among forty-seven which have been sent in from all parts of the country. The whole of them, by arrangement, provide a great hall to accommodate 2,000 persons, for lectures, concerts, and other public purposes. It will be recollected that Mr. J. R. Hartley, a former resident at Southampton, left 100,000*l.* for the promotion of literary and scientific pursuits in that town, 60,000*l.* of which were spent in Chancery and in arrangements with the claimants of his family, leaving still the princely sum of 40,000*l.* for carrying out the purposes named in the testator's will.

"SO MUCH FOR BUCKINGHAM" PALACE.

SIR,—Such are the words of *Punch*, who, joking, says, sad havock is being made with the façade, and that it is desirable a new face should be put on this stucco abomination, as it has been an eyesore long enough. Now, *Punch* is wrong in terming it a stucco abomination, for it is stone.* One contemporary says, soon after the erection of the new façade, the stone was protected by many coats of paint, and the process of decay goes on. The *Times* of June, 1855, says, 2,090*l.* were expended in repairing and painting the stonework of the new façade. So much for stone. Now for stucco abominations. I know innumerable cemented façades or buildings that are unaffected by weather, after twenty or thirty years; and, with the excellent cements we now have, it can be and is in some instances executed to endure as long as any building stone, though of course much is very badly done for cheapness, and frequently by inexperienced or careless workmen, of which there are plenty. Sometimes the cause is that the work is under a clerk of works, or a master who is by trade a joiner or painter, and the workmen are guided by his notions of how it should be done. The proportion of sand is an important part, for the best cements require two or three parts of sand to one of cement, which makes it more troublesome and expensive to use, and too little sand is a very frequent cause of failure: hence the abomination; or else, with cements that get hard enough to form cart-horse stable floors, it need not become an abomination.

JAS. PULHAM.

* It was, nevertheless, to a considerable extent faced with cement.

THE SPURGEON CHAPEL COMPETITION.

SIR,—You have often directed attention to the great unfairness usually displayed both by committees and architects in reference to competition designs; and, unfortunately, it is so general that any additional fact is scarcely needed to render it more glaring. However, that to which I am about to allude is so gross, I really think you should, by a circulation of the statement, try to awaken a condemnation in the public mind of so flagrant a departure from the principles of right.

It is respecting the "New Tabernacle" for the congregation of the Rev. C. H. Spurgeon that I pen these few lines. It will be, I doubt not, in the recollection of many of my professional brethren, that the committee distinctly stated that the cost of the building was to be limited to about 16,000*l.*

This induced several who sent in designs, myself among the number, to so arrange them that they could be executed for the amount stated, or within a few hundred pounds of the same. It was, however, very manifest, on the exhibition of the drawings, that a large proportion of the designs could not be carried out for anything like the sum proposed. * * * *

Well, the committee fixed on a design, the cost of which was stated by its author at 15,454*l.*, although I am certain that any practical person looking at the same would have said it was self-evident it could not be erected for some thousands beyond that figure. The result has proved that this idea was quite correct; for, at a meeting of the friends of the undertaking about a fortnight since, it was stated that the total amount required for building and ground would be 30,000*l.*; and as the latter cost something under 7,000*l.*, it follows that the building is to be about 23,000*l.* I must say I think such treatment is enough to prevent any respectable architect entering on a competition; for, either he must be disingenuous enough to profess to get a design executed at a sum which he must know to be erroneous, or submit to find, if he has pursued the more honourable course of shaping his design in accordance with the instructions given, that he is passed by in favour of a person less scrupulous.

MEA GLORIA FIDES.

*** We have submitted the foregoing to the architect, and subjoin his reply:—

If your correspondent looks to your columns he will find the lowest tender was 19,800*l.*, which, adding 516*l.*, the cost of foundations, and 500*l.* for fencing, gives 20,816*l.* instead of 23,000*l.* as the cost. Then, the Tabernacle is 10 feet 10 inches wider than designed, *i. e.* 80 feet 10 inches instead of 70 feet; and the vestries contain 91,000 cubic feet more than in the design. In fact, the building, as designed, if taken at the same price per foot cube as the lowest tender, would have come to 17,176*l.*, instead of 19,800*l.*, which I consider moderately near to 15,454*l.* for a competition estimate.

But the building tendered for was worth more per foot cube than the design, for the whole of the walls of the interior were to be matchboarded instead of plastering, open iron gallery fronts substituted for deal framing, the ironwork gilt, the pewing made more expensive, an expensive baptistery formed, plate glass in front windows, granite steps substituted for Portland, double handrails to the staircases, and many other additions, all of which, after making allowance for sundry omissions, added, as I estimate them, 1,500*l.* to the amounts of the tenders.

Lastly, materials and labour were both higher in July than January: the brickwork alone was worth 300*l.* more than when I made my estimate. W. W. POCOCK.

DECISIONS UNDER THE METROPOLITAN BUILDING ACT.

PUBLIC BUILDINGS.

A CASE some time under investigation, in hearing and consideration, has been settled by Mr. Bingham, at the Marlborough-street Police-court, under the Metropolitan Building Act, 18 & 19 Vict., c. 122, and excited considerable interest.

The defendants were Messrs. Loible and Sonnhammer, the lessees of the London Pavilion, a building in Tichborne-street, Haymarket, which, with its appurtenances, has been recently opened for public amusements of a somewhat varied character; for, besides being a concert-room and *café*, it is a bowling-alley and shooting gallery, and the summons, taken out at the instance of Mr. Mayhew, district surveyor for the parish of St. James, sets forth in effect that the defendants had neglected, after expiration of the term of notice according to the Act, to cause certain alterations, in and about the building in question, to be made, to render the same fire-proof, for its own and the safety of contiguous premises, and to make the same stronger in parts the better to support any large number of visitors assembled.

Mr. W. Donaldson, solicitor, attended in support of the summons; whilst Mr. M'Namara, as counsel, instructed by Messrs. Paul & Co., of New Inn, appeared for the defendants, and Mr. Edward Lewis, of Marlborough-street, watched over the interests of the builder, Mr. Honore.

A question arose as to the builder; and Mr. M'Namara said his clients would, irrespective of Mr. Honore, the builder, abide the issue of the case.

Mr. Mayhew, the district surveyor, then stated,

in categorical order, the alterations which he required in the premises, which, by previous pulling down and re-erections to make the place what it is, had, within the meaning of the statute, it was contended, become a new building; for the 10th section lays it down that, "Whenever any old building has been taken down to the extent exceeding one-half of such building, such half to be measured in cubic feet, the rebuilding thereof shall be deemed to be the erection of a new building, and every part of such old building that is not in conformity with the regulations of this Act shall be forthwith taken down." In the present case, Mr. Mayhew said, it could be proved that considerably more than half the old fabric had been taken down.

Mr. M'Namara said that to do what was required by the district surveyor would be to rebuild the structure altogether, which would be seriously interfering with ancient and vested rights and interests. The Act under consideration is to apply to new buildings, and he contended that the one in question had not been made so: it was still the old premises, with just sufficient alterations to adapt it for new purposes, and these were not one-tenth part of the whole, whilst the Act specified in clear and direct terms that half should be altered before it could be construed as a new building, and his worship had opportunity of proof of this in personal inspection. In the London Pavilion place of amusement there were no galleries, the piano was on the ground-floor, where a few singers attended, under engagement, simply for the amusement of visitors to the *café*.

Mr. Bingham, in delivering judgment, said:—The defendants took an old coach-house and stables in Titchbourne-street, painted the walls, covered an intervening court-yard with a glass roof, obtained a license to sell beer by retail on the premises, and converted the whole into a large apartment, or coffee-room, for the sale of refreshments: with a view to enticing customers they added the attractions of a musical performance, a skittle-alley, and a rifle-gallery. The district surveyor, considering the premises occupied for such purposes to be a building within the meaning of the 30th section of the Building Act, 18 & 19 Vict., c. 122, summoned the defendants to this court for not having made certain portions of it fire-proof, or sufficiently separated by party-walls from adjoining occupations, as required by that Act. He also contended that what had been done was such an alteration of the old building as brought it within the regulation applied by the Building Act to new buildings, whether public or not.—(See sec. 7.) It is difficult to draw a precise line between what shall be deemed a public and what a private building, within the meaning of the Act. A theatre, a church, a gaol, or any edifice which people are likely to frequent in great numbers at one time, such as a public ball-room or concert-room, would seem to be the objects contemplated under the words "public building" in the 30th section; but the application of the term in each particular instance must depend on the use to which the structure is applied. Here, the principal object of the defendants' occupation is the sale of refreshments: the music, skittles, and rifles are merely accessories to lead to the consumption of viands and liquors; and the apartment is no more a public building, within the meaning of the 30th section, than Evans's Rooms, or any other beer-shop or public-house where people assemble to drink beer and listen to jocose singing. Then, with respect to the alterations, which are said to be such as to bring the premises within the provision of the 7th section. After a careful inspection of them, I find there has been much superficial decoration, but no material structural alteration. There has been an addition of a glass roof over the open court; but that is admitted to be in conformity with the Act; and, therefore, my judgment must be for the defendants.

The real question appears to have been whether a building existing before the Act, and used as a public building afterwards, must be altered when works are being done on it to make its construction such as the district surveyor approves. In this case a decision was given avoiding the question, the magistrate holding that a place like the London Pavilion was not a public concert-room within the meaning of the Act, as music was incidental to the sale of refreshments. It is difficult to reconcile the statements of the district surveyor and the magistrate as to the extent of works done.

SOUTH KENSINGTON MUSEUM.—During the week ending 21st January, 1860, the visitors have been in number 12,248.

Books Received.

Some of my Bush Friends in Tasmania. By LOUISA ANNE MEREDITH. London: Day & Son, Gate-street. 1860.

IN this *livre de luxe* Mrs. Meredith, formerly Miss Twamley, depicts from life the flowers, berries, and insects of Tasmania, and accompanies them with some graceful compositions in verse. Although the greater number of the flowers there are new to an English visitor, members of many of the Old World families are found amongst them, and must gladden the eyes of the immigrant, and fill the mind with recollections.

Some will be surprised at not finding the flowers of a richer character than is presented here; but then, on the other hand, they will learn, contrary to an equally well-received opinion, that many of them have sweet scents.

This is an elegant specimen of Messrs. Day's skill in lithography and colour-printing. Plate 4, the Waratah and native Arbutus, and Plate 7, the Tea-tree and Epacris, will serve as proofs. We can cordially recommend the book for the drawing-room table.

Gog and Magog: the Giants in Guildhall; their real and legendary History; with an Account of other Civic Giants, at Home and Abroad. By F. W. FAIRHOLT, F.S.A., Hon. M. of Societies of Antiquaries of Normandy, Picardy, and Poitiers. With Illustrations by the Author. London: J. C. Hotten, Piccadilly. 1859.

THE history of the legendary and civic giants is a subject of curious interest, and no one is better able than Mr. Fairholt to turn out a pleasant little book upon it, such as this is. Mr. Fairholt is an antiquary and draughtsman of distinguished ability, whom many of our oldest readers will remember as an occasional contributor to our columns.

The scope and purpose of Mr. Fairholt's present volume may best be given by a quotation from his own pages:—

"The popular love of giants led the municipalities of many cities in Flanders and Belgium to provide figures of the kind for grand fête-days. Thus Antwerp, Louvain, Malines, Asselt, Brussels, Ath, Ghent, Bruges, Tournay, Lille, Dunkirk, Ypres, Poperinghe, Cassel, Douai, &c., have each their communal giant, which, upon certain days, is carried about these towns. They are constructed in various styles, and habited in still more varied costumes, ranging from the Roman (as at Antwerp) to the court dress of the last century (as at Brussels). Sometimes they are formed of osier, as at Cassel, Hazebrouck, and Asselt; sometimes of elaborate wood-carving of a fine and expensive kind, as at Antwerp.

In directing attention, therefore, to the carved figures which so strikingly decorate the old Guildhall of London, it will be necessary to carry our researches far beyond the comparatively recent period at which they were fabricated; to look a little at the guild observances of the great continental trading towns; as well as to take a retrospective glance at the once-popular fabulous history of the early foundation of London."

He has carried out his purpose very well, and the result is both amusing and instructive. The foreign giants have never before been brought together.

Miscellanea.

EARTH-BORING.—At Forbach, a shaft was bored by Kind, a few years ago, of a diameter of 14 feet, to a depth of 100 yards, by means of chisels fixed on iron arms, worked by a 12-horse power engine. At the Paris Exhibition, in 1855, M. Mulot exhibited a boring-cutter for a similar operation. At Ruhrort, in Westphalia, a short time since, a shaft was in course of boring of the diameter of 20 feet.—*Mining Journal.*

INAUGURATION OF THE CLIVE MONUMENT AT SHREWSBURY.—A grand demonstration took place at Shrewsbury, on Wednesday in last week, on the occasion of the inauguration of the statue erected in the Market-square to the memory of the great Lord Clive. The statue is of bronze, by Baron Marochetti, about 10 feet high, and stands upon a pedestal of Portland granite. The design of erecting this monument originated at a meeting held at Willis's Rooms, London, two years ago, on the anniversary of the victory of Plassey. The statue cost 2,000 guineas. A grand procession took place to the foot of the statue, a great many of the aristocracy of the district being in attendance. Earl Stanhope, on behalf of the subscribers, presented the statue to the mayor and corporation of Shrewsbury. The company afterwards adjourned to partake of a banquet at the Lion Hotel, to which they were invited by the mayor. The statue stood in Whitehall for some time previously.

GLASGOW ARCHITECTURAL SOCIETY. — The monthly meeting of this society was held on Monday, 16th inst., in the Scottish Exhibition-rooms, Bath-street. Mr. Salmond occupied the chair. After the reading of the minutes, and nomination of several new members, M. C. Bowie read a paper on "House Painting, its Means and Results." After comments by several members, a vote of thanks was awarded to Mr. Bowie.

LABOUR IN AUSTRALIA.—The *Melbourne Argus*, speaking of Victoria, says,—"We are in the midst of a renewed and more widely-spread struggle between the workmen and employers for the extension of the eight-hours system, and for other and perhaps more immediate advantages to the former. Men of different trades are out on strike for the eight hours in its integrity. The masons on the northern line of railway determined to leave their work unless Messrs. Cornish & Bruce would discharge all masons who did not belong to the union of their trade; and, as this demand was not complied with, they are out on strike too; and the bricklayers on some portions of the same works are out on strike for an advance of wages to the extent of 2s. a day. Tradesmen are still hanging about town in considerable numbers, complaining that they cannot obtain anything to do, and yet men who have employment throw it up thus foolishly in the hope of compelling masters to accept the very unreasonable terms dictated by the agitators at head-quarters, who are mostly men with other means of living than by the trades to which they nominally belong. The bad feeling against the contractors has been increased by the importation of masons and labourers from Germany under engagement at lower rates of wages than are current here, and the renewed agitation of the eight-hours question has been fostered and extended by the lately-formed Eight-Hours-Labour League."

PORTLAND HARBOUR.—*Once a Week* contains a pleasant paper on the harbour of refuge at Portland. We take a paragraph: "The first object of the engineers here has been to construct a rubble bank; and with this view a temporary staging carried on piles into the water is erected in the following manner. A pile is loaded heavily and sunk into the blue waves: its lower end is shod with a large cast-iron screw, while its top is fitted with a cap, having long radiating arms of wood. The ends of these arms are notched, to carry a strong rope coiled round them, one end of which passes to the shore. The arms thus form a kind of large skeleton reel, or drum, wound about with a rope, the loose end of which is then hauled upon by powerful machinery; and the pile steadied by guys, being thus made to revolve, slowly screws its way down into the solid earth, becoming firmer and firmer with each revolution. One row of piles is thus fixed, and another parallel row at thirty feet distance from the first is also screwed into the soil. Upon these, as a foundation, longitudinal timbers are laid, and on the timbers a strong platform erected. We have thus progressed thirty feet into the sea, and the hauling machinery is now worked from the staging thus formed over the spot where the blue water gurgled uninvaded yesterday. Another row of piles at thirty feet distance from the last is now screwed in, and another thirty feet won from the water. Simply told, this is all that is requisite to carry out the wooden staging far into the sea. Of the practical difficulties involved in the work we say nothing here: that they are often considerable will be easily inferred, when we remember the great depth of water in which many of these piles are screwed, and the immense weight and size of the piles themselves. Strictly speaking there are now *two* separate breakwaters being constructed at Portland, the first running due east from the shore for about 1,800 feet; and an outer or main breakwater, which is to be about 6,000 feet long, separated from the first by an opening 400 feet in width, and sweeping in a circular curve away to the north-east. The first of these, now nearly completed, is not only a sea wall, but a landing and coaling stage for large vessels as well; while the outer or main breakwater is at present nothing more than a line of rubble stonework rising above the sea.

"THE LADS WITH THEIR APRONS ON."—A reverend correspondent sends us a version of this "Masons' Song," differing somewhat from that we printed. We can find room only for the last verse:—

"Now you masons bright, take great delight,
In what is called sound masonry:
Make plain your signs, with squares and lines,
And well maintain your mystery.
But mind, though you may tramp and shift,
And seek for jobs both here and there,
No scamping work should e'er be done
By the lads who build with their aprons on."

GLASS IN STONE.—Sir: In reply to your "Subscriber," inquiring for the best cement for stopping glass in freestone frames, I can recommend mastic, mixed with boiled linseed oil, to be well mixed and beaten to a tough consistency. The stone and glass, as far as the cement is required to cover, should be previously treated with two coats of boiled oil.—C.

ELECTRO-ISOLATED CASTINGS.—After all our knowledge, the uses performed by electricity, pervading everything as it does, are but little understood. Mr. Adams, of Pittsburgh, it is said, has discovered that in casting common iron, by insulating the moulds together with the man who pours the liquid metal into them, the castings are quite a different article—coming out as white as silver and as hard as steel. The value of the discovery has not been tested. As, however, there is doubtless a measure of electricity constitutional to, and which must become latent in, every formation, the idea is a promising one. Moreover, positive electricity, we have always maintained, is a concentrative or concretive principle, more analagous to cold, for example, than to the heat which electricity itself evolves.

FALL OF A MILL AND LOSS OF 180 LIVES.—On the 10th instant, at Lawrence, Massachusetts, the main body of the Pemberton Mill suddenly fell to the ground, and buried in the ruins several hundreds of the workpeople. The mill consisted of a large main building of six stories in height, and of two small wings. The mill employed about 600 operatives, some of whom had fortunately left, and others were in the wings, which were not destroyed. There were probably from 300 to 500 buried in the ruins. About one in four who were taken out were dead, and nearly all the others were more or less wounded, some of them probably fatally. Many of the rescuers were killed by the still falling ruins. The disaster was rendered still more terrible by the bursting out of a fire amidst the ruins about midnight. It is supposed that most of the lives were lost through the fire.

COVERING THE WOLVERHAMPTON MARKET-HALL.—At a recent meeting of the Wolverhampton Council, the minutes of one or two meetings of the Markets Committee were read by the town clerk, and stated that as the plans of Mr. Bidlake, architect, for covering in the Market-hall, could not be carried out for 2,006*l.* 10*s.*,—Mr. Bidlake's estimate,—the lowest tender being 2,600*l.*,—his plans had been returned, and the plans, specifications, &c., of Mr. Henry Lloyd, of Bristol, had been accepted, under the same conditions as those laid down in Mr. Bidlake's case, namely, that they could be carried out for the amount specified in his report. In this case the estimated outlay was 2,000*l.*, and of five tenders sent in that of Mr. R. Stap, of London, who agreed to execute the works for 1,670*l.*, had been selected, conditionally upon the contractor finding the necessary sureties. A letter from Messrs. Deakin & Dent, Mr. Bidlake's solicitors, was also read, informing the committee that Mr. Bidlake claimed compensation for the loss he would sustain in not being allowed to carry out the works. After a good deal of discussion, chiefly as to Mr. Bidlake's claim, the minutes were adopted by a majority of 20 to 7, a few of the councillors refraining from voting.

A NAIL SHOP BLOWN UP AT CRADLEY.—One of those cowardly attempts to destroy property and life by the use of gunpowder, which have lately become so frequent at Sheffield and its vicinity, has just taken place at Cradley; and, we are sorry to say, as far as the former count is concerned, with complete success; and the man whose property has been destroyed had a narrow escape of his life. A horse-nail maker, named Dunn, was aroused from his sleep by a violent shock. He of course got up, and found the walls of his room shaking to such a degree that he feared they would engulf him before he could get away. His nail-shop had been blown to atoms. The wall opposite was down, windows broken in all directions, and bricks sent by the shock to a distance of 40 or 50 yards. The wall of the bed-room in which he and his wife lay was forced in, and, had not the wall been very strong, they must have been crushed in the bed in which they lay. Two men, Zachariah Willetts and William Feldon, were apprehended: they are both horse-nail makers, and were identified by Dunn as amongst four or five men whom he saw running from his premises immediately after the explosion. They are union men. A remand was granted, and the magistrates refused bail. The explosion was caused, it is supposed, by lowering a bag of powder down the nail-shop window with a cord, which was found at the top of the chimney. A long fusee would give the rascals time to escape in safety.

ACCIDENT AT THE RAINBOW TAVERN.—Last week the new wall of the Rainbow Tavern fell down. Unfortunately six poor fellows, who were at work, were injured, and were conveyed to King's College Hospital.

THE VICTORIA RAILWAY BRIDGE AT MONTREAL.—The English engineers sent out to Canada to inspect the Great Victoria Bridge have reported favourably upon the structure. The tests applied are said to have exhibited very satisfactory results.

A FREE PUBLIC LIBRARY AND MUSEUM FOR BIRMINGHAM.—A number of gentlemen who feel an interest in the progress of popular enlightenment are taking steps to secure the adoption in Birmingham of the Act for promoting the establishment of free public libraries and museums in municipal towns. They are said to entertain confident hopes of success.

MARYON'S PATENT LADDERS.—In these ladders the rounds are made with a shoulder, which is let into the inward side of the ladder about a quarter of an inch, and a smaller hole for the pin of the round is bored through to the outside. The hole is then made to taper inwardly, to allow for the expansion caused by a wedge which is driven into it from the outside. Ladders made on this principle appear to have an advantage, as the sides cannot be driven farther than the shoulders; and, being wedged on the outside, the pins obtain a dovetailed shape that keeps them firmly in their places.

MEMORIAL TO BISHOP PEARSON.—A proposal is made to raise a memorial to John Pearson, Bishop of Chester, author of "The Exposition of the Creed," who died in Chester, July 16, 1686, and was buried in the cathedral, within the rails of the altar. The memorial is intended to consist of a monument of stone, alabaster, or marble, in accordance with the architecture of the cathedral, bearing an effigy of Bishop Pearson. The promoters say, a canopy of rich metal-work may be erected over it, and the monument itself enriched with inlaid marbles, in the character of the improved style of the present day. This enrichment will depend on the amount of contributions. Subscriptions are being sought.

SANITARY AFFAIRS IN CHATHAM.—On the 20th instant, the shocking state of some property in Holborn-lane, belonging to Watts's Charity, was brought before the Local Board of Health, and the trustees were requested to appoint a committee to meet one from the Board to confer on the subject. The *Chatham News*, which appears to take an active part in the promotion of sanitary reform at Chatham, describes the state of this charity property as indescribable and horrible in the extreme, from want of accommodation for the poor people of the locality. The Board surely cannot fail to bring matters to a satisfactory state in dealing with the property of a well-to-do charity such as this appears to be.

BRIDGWATER SCHOOL OF ART.—This school was opened on the 23rd inst., in the Public Room of the town. The walls were hung with works of art. As president, the mayor occupied the chair, and addressed the meeting. The committee reported that their labours had been thus far attended with success, so that the school is about to be opened under favourable auspices. Mr. Bowler, the Government Inspector of Schools of Art, afterwards addressed the meeting, in a speech fully reported, together with the whole proceedings, in the *Bridgwater Times*. In course of his address, Mr. Bowler said there was one great point which he wanted to refer to before going into detail regarding the course of instruction, which he might do more fully in the evening, when he understood there would be a second meeting, and more students would probably be present. It was a point in which schools of art did not stand alone. The workmen wanted occupation after their work: more than this, they wanted recreation, which must be provided for. It was in supplying these wants of the majority of the people that these schools were most valuable. Undoubtedly all active, smart, intelligent men could cut through their wood and their timber, make sockets and window-frames, all in their degree of intelligence. But notice three or four intelligent men at their work, and look at them when their day's work was done—when they had knocked off at six o'clock: they would find a great difference between them. These Government schools would prove eminently useful to carpenters and blacksmiths, and furnish an innocent and suitable recreation after their work. He believed the man was more himself after work than during the whole day whilst at work. At work he must obey some one else, but after work he was no slave, but had his own pleasure to seek.

THE BRUNEL MEMORIAL.—Upwards of 1,600*l.* have been subscribed towards the proposed memorial to the late Mr. Brunel; but, as this is scarcely sufficient to accomplish the design of the promoters, the subscription lists will remain open till the committee shall determine as to the specific appropriation of the fund.

CASELLI'S PANTELEGRAPH.—The *Pays* contains an account of a visit by the Emperor of the French to the establishment of M. Froment, for the purpose of witnessing experiments in the working of the Pantelegraph at the Abbé Caselli, of Florence, which reproduces, it is said, as exactly as can be done by a photograph, every species of writing or drawing.

ALL SAINTS', WESTBOURNE-PARK.—We hear that the presentation to the church of All Saints, adjoining Westbourne-park, erected by Dr. Walker, which has remained long unfinished, has been made, and that it will be completed and consecrated early in the summer.

CONGRÈS SCIENTIFIQUE DE FRANCE.—Will you please to announce to your numerous readers that the "Congrès des Délégués des Sociétés Savantes" will be held this year at Paris, on the 9th of April, in the Rue Bonaparte, as usual; and that the "Congrès Scientifique de France" will be held at Cherbourg, on the 2nd of September. The presence of English antiquaries on either or both of these occasions will be particularly acceptable to their brethren in France. It is highly desirable that the leading persons occupied in the same pursuits in the two neighbouring countries should be personally acquainted, and ready to assist each other.—A. DE CAUMONT (*Paris*).

VENTILATION: LIVERPOOL POLYTECHNIC SOCIETY.—At the usual meeting of this society, on Monday evening before last, at the Royal Institution, Colquitt-street, Mr. Scott in the chair, Mr. George Reid, of Bootle-lane, read a paper "On the Principle of Ventilation." He showed a series of experiments with his carbon test, rendering the effects of foul air visible, and with other apparatus demonstrated several improvements in the art of ventilating. A discussion followed, and a vote of thanks was accorded to the lecturer.

WORKMEN'S INSTITUTE AND BENEFIT CLUB FOR LAMBETH.—Endeavours are being made to establish, at 34, York-road, Lambeth, a branch of the new institution at 239, Euston-road, under powerful patronage; the Duke of Northumberland being the president; the Earl of Carlisle, Lord John Russell, Lord Overstone, Lord John Manners, Earl Spencer, and other noblemen, being vice-presidents; Baron Rothschild, Mr. H. E. Gurney, Mr. Thomas Baring, Mr. Gladstone, and other gentlemen, trustees; Mr. St. Leger Glyn, treasurer; and Mr. Thomas Piper, Mr. C. Lucas, Mr. J. Rigby, and various other gentlemen, form the committee. The rules of the benefit club connected with the institute have been approved by the Registrar of Friendly Societies, and are now printed, and may be obtained, we presume, at York-road, Lambeth, or at Euston-road. The Lambeth branch was to be opened on the 18th instant. These new institutions are designed to extend their influence and advantages to workmen in all branches of trade, but particularly to the building trades operatives; and, without, of course, committing ourselves to all its details, and although we would like to see one powerful and extensive institution rather than many small ones, the endeavour to benefit the workmen in this way has our hearty good wishes.

HOLLOW WALLS.—Air is a poorer conductor than stone, and costs nothing save the box or hollow in the wall which holds it, and this is only a question of slightly increased labour in construction, and not a question of material, for the same amount of materials may be made stronger if hollow than if solid. Here we come to the great and common mistake which too often renders hollow walls no better than solid ones, viz., instead of absolutely confining the stratum of air, and isolating it from the outer atmosphere, they permit it to change, to escape when heated, and make room for fresh air from without; in short, to *circulate*, in which case they are worse than a single wall. Many attempts are made, especially in the country, to prevent the dampness of brick or stone houses by making hollow walls, and they generally fail because the contained air is not absolutely confined. Dampness does not come from without, through the wall, but is deposited from the air within when it comes in contact with the walls, which have been made cold simply because they are not thorough non-conductors. The greatest care should be taken to stop all holes, however small, especially between the outside atmosphere and the enclosed non-conducting stratum.—*Engineer*.